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THE OFFICIAL STATISTICS OF JAPAN.*

I. HISTORICAL.

The question of official statistics was among the first to be considered by the Japanese authorities, when the administrative organs were started anew on the Restoration of the Imperial régime (1868). In 1871, a section called the Seihyokwa (the Section of Political Tables) was set up in the Dajōkwan (the central office for general political affairs, now the Cabinet), and through its operation various statistics were compiled and published under the title of "Japan Political Tables." This section indeed was the first central organ of statistics created in Japan. The year 1881 saw the establishment of the Bureau of Statistics in the Dajōkwan, having for its general object to promote the statistical work of the government. But in 1885, when the government organization was remodeled, the Dajōkwan was replaced by the Cabinet, and the Board of Statistics was turned into the Bureau of Statistics, under the control of the Cabinet. In 1893, the Bureau was again reduced and placed under the Cabinet Secretariate as the Section of Statistics. In 1898, however, this section, coming under the direct control of the Cabinet, resumed the name of Bureau with its scope enlarged accordingly, and in this condition it has remained to this day. In 1918, a new institution, named the Temporary Census Bureau, was added to the Cabinet with the object of carrying out the First Census in 1920. The Bureau of Statistics, then, together with this sister establishment, may be said conjointly to form the central organs of statistics in the Empire.

* This article, prepared under the direction of the chief of the Imperial Bureau of Statistics of Japan, was intended for our Memorial Volume, but was received too late to be included.

Besides these central bureaux, each prefectural office as well as each department of the government since the early years of the Meiji era (which begins with 1868) has been provided with a special organ for the purpose of collecting statistics on matters falling under their respective jurisdictions, and in this manner there has existed a definitely established system of statistics all over the country which has continued to develop up to the present time.

For Reference.

A. The Successive Heads of the Central Organs of Official Statistics.

Kōji Sugi, Chief of the Seihyōkwa of the Dajōkwan. December, 1871 to May, 1881.

Fumio Yano, Manager, Acting President of the Board of Statistics of the Dajōkwan. June, 1881 to October, 1881.

Shigenari Yasukawa, Manager, Acting President of the Board of Statistics of the Dajōkwan. November, 1881 to April, 1882.

Vicount Koyata Torio, President of the Board of Statistics of the Dajōkwan. (Lieutenant-General.) April, 1882 to December, 1885.

Shigetomo Ishibashi, Director of the Bureau of Statistics of the Cabinet. December, 1885 to November, 1893.

Shigetomo Ishibashi, Chief of the Section of Statistics of the Cabinet. (Secretary of the Cabinet.) November, 1893 to June, 1895.

Masahisa Motoyama, Chief of the Section of Statistics of the Cabinet. (Secretary of the Cabinet.) June, 1895 to February, 1897.

Naosaburō Hanabusa, Chief of the Section of Statistics of the Cabinet. (Secretary of the Cabinet.) February, 1897 to October, 1898.

Naosaburo Hanabusa, Director of the Bureau of Statistics of the Cabinet. November, 1898 to April, 1916.

Toratarō Ushizuka, Director of the Bureau of Statistics of the Cabinet. April, 1916–.

Count Hideo Kodama, President of the Temporary Census Bureau. (Chief Secretary of the Cabinet.) May, 1918–.

Toratarō Ushizuka, Vice-President of the Temporary Census Bureau. May, 1918–.

B. The Membership of the Central Organs of Official Statistics (including additional posts).

	Chokunin rank.	Sōnin rank.	Hannin rank.	Employees.	Total.
Dec. 30, 1871			4		4
Dec. 31, 1875		1	23		24
Dec. 31, 1880		2	18		20
Dec. 31, 1885	1	7	23	27	58
Dec. 31, 1890		1	?	?	?
Dec. 31, 1895		1	20		21
Dec. 31, 1900	1	3	22	50	76
Dec. 31, 1905	1	3	16	80	100
Dec. 31, 1910	1	5	14	145	165
Dec. 31, 1915	1	3	13	124	141
Dec. 31, 1917	1	3	12	131	147

II. THE PRESENT SYSTEM OF STATISTICAL ORGANIZATION AND WHAT IT HAS ACHIEVED.

(1) The present central and local organs of official statistics are composed of the following members and do statistical work within their respective spheres:

The Cabinet.

The Bureau of Statistics. Director, statisticians (the above are of higher ranks), assistant statisticians, minor officials and employees.

The Temporary Census Bureau. President, vice-president, secretary, statisticians (the above are of higher ranks), assistant statisticians, minor officials and employees.

Each Department of the Government. Superintendent of statistics (higher rank), minor officials and employees.

The Hokkaidō Administration Board and each Prefectural Office. Superintendent of statistics (*hannin* rank), minor officials and employees.

(2) The present central, departmental and prefectural organs of official statistics have, respectively, the following statistical functions:

The Cabinet.

The Bureau of Statistics.

a. The unification of statistics collected by various departmental and prefectural offices.

b. Collecting statistics of the population, and other statistics not belonging to any individual administrative department, namely, those relating to the state of the population (prepared every fifth year), the movement of the population and the causes of deaths (prepared every year), compiling the Statistical Year Book and the Summary of Statistics every year, and occasional investigations and compilations of miscellaneous statistics.

c. Exchanging statistical publications between Japan and foreign countries.

d. The convocation of the superintendents of statistics of departmental and prefectural offices, and holding conferences.

The Railway Board.

Collecting statistics concerning state railways, private railways, light railways and tramways.

The Department of Foreign Affairs.

Collecting statistics relating to the Japanese subjects living abroad.

The Department of Home Affairs.

Collecting statistics concerning Shinto shrines, local administration, elections, police, public works, sanitation, geography, copyright, charity and relief.

The Finance Department.

Collecting statistics regarding finance, accounts, taxes, national loans, currency, deposit money, custody, banking, trust and mutual financing.

Collecting statistics relating to tobacco, salt and camphor and statistics relating to imports and exports and transportation to and from oversea dominions.

The War Department.

Collecting statistics concerning the army.

The Naval Department.

Collecting statistics concerning the navy.

The Department of Justice.

Collecting statistics respecting civil cases, criminal cases, voluntary jurisdiction, census registration, prisons, the protection of discharged prisoners and other judicial functions.

The Department of Education.

Collecting statistics relating to education, science, art and religion.

The Department of Agriculture and Commerce.

Collecting statistics relating to agriculture, commerce and industry, marine products, forestry, mining, geology, and the enforcement of the Factory Law.

The Department of Communications.

Collecting statistics concerning the post, parcels-post, telegraph and telephone, nautical marks, hydraulic power for electricity, electrical business, shipbuilding, land and marine transportation, sea-routes and sea-men. Collecting statistics relating to postal money orders, postal savings, postal life insurance, the payment of pensions and annuities, receipts and payments made on behalf of government offices.

The Chōsen Government-General.

The Taiwan Government-General.

The Karafuto Administration Board.

Collecting statistics relating to the work of their respective jurisdictions.

The Hokkaidō Administration Board and each Prefectural Office.

Collecting miscellaneous statistics relating to the affairs within their respective jurisdictions.

(3) Each government office in the empire has annually published books of statistics compiled by its own statistical organ. As to those issued by the central organ, a brief note will be given later under the head of "Publications."

(4) The following are the principal results hitherto attained by the central organ of statistics:

In the early years of Meiji, the government prepared a plan of census-taking which was to be extended over the whole country. By way of experiment, it caused, at the end of 1879,

the entire province of Kai (identical with Yamanashi Prefecture, one of the present administrative divisions) to be brought under census-taking by the modern method, and the results were arranged and published later by the Board of Statistics.

In 1902, the Law of Census (Law no. 49 of the same year) was promulgated.

In 1903, an estimate was presented to the Imperial Diet for carrying out the first census in the empire in 1905, but the scheme was cut short by the dissolution of the Diet.

In 1910, the Preparatory Census Committee was instituted as an advisory organ to the prime minister with respect to the projected first census, and it continued to 1913.

In 1917, an estimate was presented to the Imperial Diet for the first census to be taken in 1920, and the parliamentary approval of this gave rise to the establishment of the Temporary Census Bureau in the following May. Chōsen, Taiwan and Karafuto also, with their own estimates passed, set up special organs in order to participate in the Imperial census-taking.

(NOTE: Though the above-mentioned census-taking is a matter of the future, it is one which has formed such an important problem since the foundation of the central organ of statistics that its mention here seems appropriate.)

(5) Among the affairs dealt with by the central organ, the international relation of statistical work is a matter which, from the first, has received particular attention. Thus in 1875, at the International Congress of Statisticians held at Budapest, our empire was represented by the French statistician, M. Block Maurice, while to every Conference of the International Institute of Statistics held since 1899 we have sent a delegate, the names of the delegates being Count Y. Yanagisawa, Dr. N. Hanabusa and Dr. I. Takano.

III. THE PROSPECT OF OUR OFFICIAL STATISTICS.

With the progress of time, the public business and enterprises in the empire have become more and more complicated and diversified, and consequently our official statistics have increased remarkably in scope as well as in detail.

In view of the present conditions, it is undoubtedly of vital

importance for us to be constantly supplied with accurate and well-founded calculations of all the elements of the national power, in order that whatever we may project or put in operation may be based upon the exact knowledge thus obtained of the full extent of our national resources.

If we turn our eyes, however, to the existing system of our official statistics, we find it far from adequate to the requirements of the day. Outside a few classes of statistics relating to the movement of the population and to factories, our central organ is scarcely equal to undertaking itself that indispensable observation of units which lies at the bottom of all statistics, and since much of the investigation and tabulating work in that line is left to the lower administrative organs, we can not expect to see any high degree of accuracy or unity in the results thus produced, but must often be contented with the supply of rough and imperfect information. On the other hand, our central organ is deplorably limited in its function by the fact that the greater part of the statistical work in the empire is divided among and put in charge of various government offices.

Obviously, this tends to produce a lack of interrelation and uniformity among different parts of the statistical work, not to speak of the financial disadvantages which are inevitable under such circumstances.

It is needless to say that, in order to remove these obstacles to a fruitful conduct of our statistical work, the first step to be taken is the expansion of the central statistical organ. It must be reorganized on an enlarged scale and made competent to build up a well-ordered, consistent system of statistics by gradually drawing to itself that part of the work which now is in the hands of various offices and needs to be centralized. As to the methods of investigation and tabulating, there must be a fundamental reform, in accordance with the requirements of science.

THE PUBLICATIONS BY THE CENTRAL ORGAN OF STATISTICS.

Japan Political Tables, annually issued from 1872 to 1880. The contents were as follows: Foreign Trade, Government Officials, Police, Justice, Hereditary Stipends and Rewards, and the Population.

(NOTE: In the early years of Meiji, "Seihyō" [political tables] was our term for statistics.)

Tables of Prefectural Finance, issued annually from 1875 to 1880.

Imperial Statistical Year Book, issued annually since 1882.

Summary of the Imperial Statistics, issued annually since 1887.

State of the Population of the Empire, issued every fifth year since 1898.

Movement of the Population of the Empire, issued annually since 1899.

Statistics of the Causes of Death, issued annually since 1906.

Besides the above-mentioned, there are dozens of publications issued occasionally since 1899, including statistical material mainly concerning the population, and the results of the study and discussion of miscellaneous statistics.

THE ITALIAN FACTOR IN THE RACE STOCK OF ARGENTINA.

By Robert F. Foerster.

That there is a large colony of Italians in Argentina and that it has played a striking part in the Argentine economic development are facts widely, if vaguely, understood. But that the Italian population, or let us rather say, the Italian strain, has been preponderant in some important sections of the country, and in the whole land has been second only to the Spanish—at least half as large as the Spanish—has not been appreciated. Statistical data of great interest exist to show, approximately, what the strength of the Italian factor is. Since figures equally discriminating are very rare in the records of the newer countries, it is the more worth while to study these data. It is likely, in fact, that the demographic developments which have taken place upon a large scale in Argentina have many counterparts among Italian (and other immigrant) colonies elsewhere.

Of the importance of Italian blood in the first half of the nineteenth century it is difficult to speak. There were groups of Italians in Buenos Aires, in Rosario, and about the rivers. Probably they intermarried little with the older stock, and probably they had numerous children—already designated, by the fact of their American birth, as Argentines.

Had the meager first census of 1857 specified nationalities, it would have shown an appreciable Italian element. It gave only an admittedly incomplete guess (liberal, however, as far as it went), of the population of the country; and the lacunae were filled out in 1860 by another guess, and the total proclaimed as 1,210,000.* Of these the Italians and their children were certainly not less than 1 per cent. and presumably not more than 2 per cent.†

* República Argentina, *Segundo censo*, Vol. II, p. xvi.

† In a volume dealing comprehensively with Italian emigration and its problems, shortly to be published, I have given some particulars regarding this and later periods which do not appear in the present article. On the other hand, the computation and almost the entire evidence here detailed are omitted from the book.

Very interesting is the contrast of the census figure just quoted with that for immigration between, say, 1857 and 1910. In this period, four and one-half million immigrants, in round numbers, entered the country, of whom perhaps two and one-half millions or more did not again depart from it. Between 1857 and 1869 about 150,000 immigrants came, of whom more than 100,000 were Italian. In 1869, the population (without Indians), according to what has been officially designated as the first census, was 1,737,076. Of these, 201,292, or 12.1 per cent., were foreigners, mainly Europeans, and largely Italians. But included in the Argentines were the descendants of the earlier Italians and the native children of those who had come since 1857. From many sources it is clear that the settlers had large families.

Twenty-six years elapsed before another census was taken—the latest national census. Then (1895) the population was 4,044,911, an increase of 121 per cent., or 2,307,835. More than 800,000 Italians had meanwhile arrived, the total being reduced, by death and emigration, to 492,636, in a total foreign population of 1,004,537. The "Argentine" population, however, of 2,950,384, included the living children of the Italian population of 1869 and of the immigrants arrived after that date. Did the descendants of the Italians number 350,000? If for the moment we may suppose so, then the Italian strain of 850,000 persons was about one third as large as the 2,600,000 of the older Argentine stock and the descendants of non-Italian immigrants. In 1895 non-Italian foreigners numbered 501,891, but little more than the Italians; their descendants may have been as numerous as the Italians'. Then twice 850,000 or 1,700,000 was the population of foreigners and their native children, while the older Argentine population was 350,000 less than 2,600,000 or 2,250,000. Then, of the total population, the foreign factor was 43 per cent. and the old native population 57 per cent. Between 1895 and 1910 the net immigration (excess of immigrants over emigrants) was about 1,400,000; of which the net Italian immigration was about 700,000. Between those years, the stocks of 1895, by excess of births over deaths, might have been increased 50 per cent.—the foreign to 2,550,000, the Argentine to 3,375,000.

The foreign, however, in consequence of an additional immigration of 1,400,000, would have risen further, to 3,950,000; and still further, through the excess of births over deaths of the new immigrants of these fifteen years, say to 4,200,000. Then, by 1910, there would be a population of 7,575,000 (a figure not far from the estimates of recent years), of which the old Argentine stock would be 44 per cent. and the foreign 56 per cent. And the Italians, since they were half the foreigners of 1895 and half the newer immigrants, might be 28 per cent. of the total.

These are impressive results. But can they be justified? There is a doubt concerning the amount of the native-born foreign stock of 1895, and a doubt concerning the assumption that the rates of reproduction of Argentine and immigrant factors were equal. What follows does not finally deal with these doubts, but it suggests that, at the least, if the first estimate overstates the foreign factor, the second understates it, and the net conclusion must be not far from that suggested.

In the city of Buenos Aires, in the five years 1860–1864, there were 2,092 marriages of Argentine men with Argentine women, 758 marriages of an Argentine man or woman with a European, 2,648 of European with European. In 1865–1870, six years, there were 2,946 marriages of Argentines, 1,391 of mixed stocks, 4,960 of Europeans. In the campaña of Buenos Aires there were in the eleven years 1860–1870, 12,581 inter-Argentine marriages, 3,001 mixed, and 3,023 inter-European.* Or, to combine these figures, there were in 1860–1870, in the entire city and province of Buenos Aires, 17,619 native marriages, 5,150 mixed and 10,631 European. Since mixed marriages perpetuate both strains, half may be added to the Argentine and half to the foreign. Then the Argentine marriages stand at 20,194 and the foreign at 13,206—say 60.4 per cent. and 39.5 per cent. respectively.

In this period, antedating the development of cereal production, the Italian element was more numerous than any other foreign element, and in Buenos Aires city, Italian marriages exceeded Argentine. In the other provinces the native element had still an unquestioned supremacy.†

* *Rejistro Estadistico de la República Arjentina*, 1869–1871 (Buenos Aires, 1873), p. 292.
† *Ibid.*, pp. 294–299, 309.

Yet even then—what has often been observed among large immigrant populations—the newcomers reproduced more rapidly than the native population. In 1860–1864, 10,198 children of Argentine parents were baptized in Buenos Aires city, and 9,786 of foreign parents; in 1865–1870, 11,215 of Argentine and actually 18,399 of foreign parents. Here, indeed, was the irrupting wedge of the new people. But in no other part of the country had it yet pressed so far. Quite as noteworthy is the difference in death rates, for the foreign stock was in the healthy years of life. Among Italians in Buenos Aires city the deaths in 1865–1870 were as one to twenty of the Argentine deaths.*

The census figures of Buenos Aires city, for 1869, may seem to overstate the Argentine strength. In a population of 177,787 they show 41,957 Italians and 89,661 Argentines.† Scrutiny, however, shows that most of the Argentines were very young—the native children evidently not only of the Argentines but of the prolific foreigners (who had begun to come numerously after 1852). Of these Argentines, 35,815 were under ten years of age, 57,074 under twenty. Of the Italians only 3,012 were under ten years and 10,218 under twenty. The 31,739 Italians over twenty were nearly equal to the Argentines over twenty (32,587), and contained fewer people who had passed beyond the reproductive years.

For the period 1870–1880 our information is slight. Although immigration was much below the level it was to attain in the next decade, the foreign biological influence was considerable. In 1882, there were 10,477 births in Buenos Aires city; of 1,836 children the parents were both Argentine, and of 4,049 were Italian; in addition 803 were children of Italian men and Argentine women. In the full decade beginning 1882, births from Argentine unions numbered 22,020; those from Italian unions were three times as many, or 68,703 (annually they were 40–44 per cent. of all births in Buenos Aires), and there were also 10,647 births from unions of Italian men and Argentine women.‡ In this period the number of

* *Ibid.*, pp. 313f., 330, 334–336.

† Buenos Aires, *Censo general*, 1887, Vol. I, pp. 447f.

‡ Buenos Aires, *Anuario estadistico*, 1891, pp. 43–45.

births from Italian unions increased 136.6 per cent., from unions of Italians men and Argentine women 87 per cent., from Argentine unions 45 per cent. We must remember, of course, that a large increase of Italian parents came by immigration, but also that an important part of the Argentines of this period are the Italian-blooded descendants of the Italian population resident twenty or thirty years previously.

A reflection of the fact that the immigrants were in the reproductive years of life appears for the municipal census year of 1887, when the birth rate of the Italians in Buenos Aires was 59 per 1,000, while that of the Argentines was only 28. The high rate was due not only to the greater fecundity of the Italians but also to their high marriage rate. Throughout the period 1882–1891, the number of Italian marriages, already large, increased, till, in 1891, there were 90 per cent. more marriages of Italians than of Argentines.* In the census year 1887, there were in Buenos Aires 11 Italian marriages per 1,000 of Italian population, but less than half this rate, or 5.3 per 1,000, of Argentine population,—a population, as we have seen, in which the young children of foreigners were numerous. The census showed that not only were more Italians married, but their marriage rate—despite the preponderance of men in the immigrants—was higher. It showed that—†

Married	Argentine	men	were	10,223,	or	36.7%	of Argentine	men	over 20
"	Italian	"	"	29,339,	"	38.7%	" Italian	"	" "
"	Argentine	women	"	15,897,	"	30.6%	" Argentine	women	" 15
"	Italian	"	"	26,161,	"	65. %	" Italian	"	" "

In this period 1882–1891, marriages of Italian men with Italian women averaged about 31 per cent. of all marriages in Buenos Aires, and marriages of Italian men with Argentine women averaged an additional 10 per cent.‡ Many, and probably most, of these Argentine women must have been the children of Italian parents. Certainly such would tend to be sought by the newcomers. In the great majority of the marriages in Buenos Aires the husband was several years, often ten or

* *Ibid.*, pp. 61f.

† *Censo general*, 1887, Vol. II, p. 439.

‡ *Anuario estadistico*, 1891, p. 63.

twelve, older than the wife—a particularly unlikely situation where the wife was of older Spanish stock.* It is to be remembered also that young wives will have long child-bearing careers.

In 1869 foreigners were somewhat less than half the population of Buenos Aires. In 1887 they stood 112 against 100 Argentines. In the eighteen intercensal years the foreign population had grown, through immigration alone, by 160 per cent.; the Argentine—by the natural increase of the old Argentine and of the new foreign stock—128 per cent.† Only 22 per cent. of the school population (6–14 years) were of foreign birth. The Italian population was 138,166, an increase of 212 per cent. since 1869—a rate approached by no other important strain. In this period therefore the Italian contribution, by way of births, to the Argentine population must have been very heavy. In the reproductive years of life, fifteen to fifty, were 41.6 per cent. of the foreigners, a larger proportion than in 1869; and only 18.3 per cent. of the Argentines, less than in 1869. These conditions may be made clearer in a series of tables.

A‡

(Percentages refer to the whole population, except men under 20 and women under 15.)

15.1%	were	single	Argentines
24.3%	"	"	foreigners
11.4%	"	married	Argentines
41.3%	"	"	foreigners
3.0%	"	widowed	Argentines
4.7%	"	"	foreigners

B§

43.0%	of the	Argentine	men	over	20	were	married	(in 1869, 49.4%)
36.3%	" "	"	women	"	15	"	"	(" " 32.4%)
but 52.6%	" "	foreign	men	"	20	"	"	(" " 46.8%)
and 66.6%	" "	"	women	"	15	"	"	(" " 60.7%)

Mainly, however, the significance of these conditions is to be sought in statistics of births (legitimate):

* *Censo general*, 1887, Vol. II, p. 420; *cf.* p. 444. In 1882–1887, of 6,376 men marrying at 25–30 years, 2,553 married women of 15–20 years, 2,099 women of 20–25 years.

† *Ibid.*, p. 7.

‡ *Ibid.*, p. 20.

§ *Ibid.*, p. 21.

C*

Father Argentine,	mother	Argentine	1,926	(in 1869,	1,663)
"	"	foreign	322	(" "	173)
" foreign,	"	Argentine	1,932	(" "	1,443)
but "	"	foreign	9,761	(" "	3,645)†

D†

Father Argentine,	mother	Argentine	1,900	
"	"	foreign	318	
" Italian	"	Italian	7,026	
" "	"	Argentine	1,011	
" Spanish	"	Spanish	1,080	
" "	"	Argentine	412	

The total births, except illegitimate (1,974) and of colored parents (171) were 13,965. Note how rarely, judging by births, the Argentine man marries a foreign woman, and how frequent is the contrary case.

Of the births of 1887, 47.1 per cent. were from Italian mothers, and 24.9 per cent. Argentine. Children who were not more than the eighth birth in a family, had in 3,710 cases Argentine mothers, but in 7,112 cases Italian mothers—nearly 90 per cent. more.‡ These Argentine mothers had already borne 11,404 children but the Italian mothers had borne 23,330—nearly 108 per cent. more. Many of the Italian mothers were recent immigrants and young women, with child-bearing careers largely ahead. The greater fecundity of the foreign stock is still further shown in figures compiled for the six years 1882–1887. For each ten marriages of Argentines there had been, by the census year 1887, 32 children; for each ten foreign, 51 children.§ Still more detailed figures show that the Italians more often have children than do Argentines and have more children.**

To give an indication of the strength of the various important nationalities in the population of Buenos Aires in 1887, I have indicated below the number of existing marriages of each sort and their issue. In reading the table it must be remembered that Argentine families, as a class, have been longest in existence.††

* *Ibid.*, p. 411.
† *Ibid.*, p. 410.
‡ Compiled on basis of figures in *ibid.*, pp. 412ff.
§ *Ibid.*, p. 427.
** *Ibid.*, pp. 428f.
†† *Ibid.*, pp. 439f; I have calculated the figures of the last column.

Number of Marriages	Husband	Wife	Children per 100 Marriages	Total Number of Children
8,875	Argentine	Argentine	234	20,767
374	"	Italian	161	602
3,179	Italian	Argentine	228	7,248
25,006	"	Italian	228	57,013
331	"	Spanish	200	662
1,602	Spanish	Argentine	233	3,732
4,364	"	Spanish	208	9,077
2,970	French	French	177	5,256

In the same year, 1887, the provincial census of Santa Fé was taken. Its statistics are much less detailed than those we have been considering. Of married Argentines 14,717 were found, and an almost equal number, 14,736 of married foreigners, mainly Italians. The average number of children had been 4.9 for the Argentine families and 4.6 for the foreign.* Presumably, in this country of early marriages, the Argentines included no inconsiderable number of the children of Italians. For there were actually more foreigners (3,879) who had been married more than twenty years than Argentines (3,690), and they had been the parents of many children: the Argentines of 27,032, the foreigners of 26,269.† Of the older Italians many had been married in Italy. In this province of Santa Fé, the second in population in Argentina, the Italian factor had great strength.

The year 1895 brought the second national census. In the twenty-six years since the previous census, the native population had not quite doubled, while the foreign had quintupled and come to be one third the size of the Argentine. Italians, who meantime had been three fifths of all immigrants—many being seasonal—were 49 per cent. of the foreign population. After them came the Spanish (19.8 per cent.) and the French (9.4 per cent.).‡ How largely the Argentine population represented recent births, and therefore largely births from foreign unions is manifest in the age statistics. If Argentines under twenty years of age (1,770,831) are deducted from the total number of Argentines (2,950,384), only 1,179,553 are left who were born before 1875. Those born before 1865 were

* Santa Fé, *Primer censo*, Vol. I, p. xcvii.

† *Ibid.*, p. xcviii.

‡ República Argentina, *Segundo censo*, Vol. II, p. xliv.

only 710,900. Exactly one half the population of the country were under twenty years of age. Among the Argentines, 61.3 per cent. of the males, 58.7 per cent. of the females were under twenty years; among the foreigners only 17.8 per cent. and 25.7 per cent., respectively. Of the foreigners, 796,979 had been born before 1875; 569,639 before 1865.* These figures suggest that many of the Argentines were the children of foreign parents.

More definitely is the increasing importance of the foreign element demonstrated in the census statistics concerning the marital status of persons who had reached their fifteenth year. For comparison I give also the figures for 1869.†

	1869.			1895.		
	Men	Women	Total	Men	Women	Total
Argentine:						
Single	557	525	540	583	508	545
Married	386	349	366	325	351	339
Widowed	57	126	94	39	104	73
No data	....	....	....	53	37	43
	1,000	1,000	1,000	1,000	1,000	1,000
Foreign:						
Single	576	294	500	442	204	358
Married	381	591	438	494	677	559
Widowed	43	115	62	42	104	64
No data	....	....	....	22	15	19
	1,000	1,000	1,000	1,000	1,000	1,000

It is difficult to explain these striking differences between the native and foreign elements only by supposing that the single men, of whom there are 141 more in 1,000 Argentines than in 1,000 foreign, marry later in life than formerly. (So far as the Argentines marry later than the foreigners, their generation is longer and their contribution to the race, in any given period of time, less.) The change since a quarter century earlier has been mainly among the foreigners: more of them, women as well as men, are married. Among women the absolute figures are truly striking.

Of 315,350 adult foreign women, 213,695, or 68% are married
" 818,080 " Argentine " 287,516, " 35% " "

*Compiled from *ibid.*, Vol. I, p. xcix.
†*Ibid.*, p. cviii.

Since, furthermore, 46,926 married Argentine women have foreign husbands, only 240,590 are married to natives. And of these a large part undoubtedly are the children of immigrants, rather than of the anterior population.

An explanation of the declining importance of the old stock made by the director of the census is *à propos*. The foreigners, he declares, are more industrious and thrifty than the natives, and so more quickly and more surely reach a stage where they can afford to marry. While the Argentine woman is usually only a consumer, the foreign wife nearly always aids her husband in production. The foreigner relies upon this economic aid. The native does not expect it, therefore avoids marriage, and—*razon poderosa*—finds its substitute in the less expensive luxury of illicit relations.*

The figures of 1895, showing the child-bearing part of the foreign-born population to be not greatly less than that of the native-born, concern the whole country. Yet the figures for Buenos Aires, as utilized in the year-book of that city, have additional interest.† There, of the Argentine women who had reached their fifteenth year, 25,792, or 37.7 per cent., were married; of the foreign women, 75,859, or 69.5 per cent. A later age at marriage, in the case of the Argentine stock, will diminish but by no means undo the difference. In each 1,000 Argentine women, single or widowed, aged 15 to 50, 51.2 married during the year; in 1,000 Spanish, of the like class, 106.4; in 1,000 Italian, 134.8. And again, for 1,000 married Argentine women of these ages, the year's births were 92; for 1,000 Spanish, 155; for 1,000 Italian, 194. Señ. Martinez, describing the "social capillarity" of the Argentine population, parodies Malthus: desires grow in geometrical progression, but the possibilities of satisfying them only in arithmetical progression.

Since 1895 a decline has taken place in the relative strength of the Italian-born factor in Buenos Aires. Marriages to which both parties were Argentine were, in the early 1880's, about 20 per cent. of all. After lapsing to 13 per cent. in 1890, they rose again, by 1900, to 21 or 22 per cent.,—a com-

* *Ibid.*, p. cxiii.

† Buenos Aires, *Annuaire Statistique*, 1895, pp. li–lix.

mon proportion since. Italian marriages, from having been upwards of 30 per cent. in the early 1880's, declined to 27 per cent. in 1897 and to 17 or 18 per cent. in 1907 and 1908. Spanish marriages rose from 6 per cent. in 1882 to 10 per cent. in 1889, then to 12 per cent. in 1899 and 20 per cent. in 1908. Thus Spanish marriages were one half the Italian marriages of 1899 and actually surpassed their declining share in 1908. It must, however, be added that while the unions of Spanish men and Argentine women have fluctuated little about 4.5 per cent. since 1882, Italian marriages with Argentine women have of late years been nearer 11 than 9 per cent. These figures seem to indicate that immigrant intermarriage with old Argentine stock is, and probably has been rare. Since Spaniards speak the same language as the old Argentines, their intermarriages would naturally be at a greater rate than those of Italians and Argentines. The conclusion seems appropriate that in Italo-Argentine marriages the bride is the native daughter of an Italian.* If the conclusion be accepted, then the Italian marriages of 1908 did still exceed the Spanish.

That the Argentines have come to be largely the descendants of immigrant stock of the last few decades is a thesis further to be strengthened in the statistics offered by the Buenos Aires municipal census of 1904. It appears that this great city has only recently begun to rely for its increase of population on births. Before the great immigrations, in 1869, natives of the capital were 44.4 per cent. of the population. In 1887, they were only 17.3 per cent.; in 1895, 26.6 per cent.; in 1904, 33.7 per cent. Indeed, the prodigious nine-years growth from 663,854 to 950,891 inhabitants was mainly from births; the population from this source increased 64 per cent. while that that had come from abroad increased only 24 per cent. In the total population of Buenos Aires, natives, born in whatever part of Argentina, now numbered 55 per cent., Spaniards 11, and Italians 24.†

An examination of the age statistics of this census should set beyond a doubt the correctness of the view that the

*In 1908 two thirds as many Italians married Argentines as married Italian women. All the figures in this paragraph are based on the year-books issued since 1895.

†Buenos Aires, *Recensement général*, 1904, pp. lxiiif, 23–25.

Argentines derive mainly from the immigrants who came since 1860 and who chiefly were Italians. Of the 534,041 persons composing the Argentine group, 364,964, or 69.5 per cent., had not yet reached the age of twenty—*i. e.*, had been born since 1884. In addition, 98,602 had been born between 1869 and 1884.* So 463,566, or actually 88.6 per cent. of all the Argentines, had been born since 1869. Had the native population censused in 1869—78,976 born in the capital, 6,653 in the provinces (surely even in these figures were some children of foreigners)—doubled by natural increase each twenty-five years, it could have accounted for only 256,887, or 49 per cent. of the Argentine population of 1904. But an old population in a city almost never doubles in twenty-five years; on the other hand, there had also been provincial immigrants.

Consider the age statistics further, however. Foreigners under twenty, who therefore had contributed few children to the Argentine population were only 62,008, or 14.4 per cent. of the foreign population. Above this age the foreigners, with their high marriage rates and birth rates, must have contributed many children. Foreigners aged 20–49 numbered 283,455, or more than twice as many as the natives of the same years (140,081); these groups were still reproductive. Of persons older than 50 years—born before 1854—there were 17,370 Argentines and 77,047 foreigners. For the significance of these figures it must be recalled that very few immigrants arrive after the expiration of the reproductive term, and most arrive before that term is even half past.†

Not only has the older Argentine stock in Buenos Aires been submerged by the immigrant stock, but in the latter the Italians have easily led. There were in 1904 only 28,664 Italians under 20, but there were 152,073 Italians aged 20–49, or actually 12,000 more than Argentines of these ages; and there were 47,158 over 49 years, or about 30,000 more than Argentines of this group. The recent increase of Spanish immigrants is yet far from equalizing the two populations in Buenos Aires: in 1904 they were only half as numerous as the Italians in both the age groups 0–19 and 40–49, and above 49

* Age groups 20–24, 25–29, and one half—a conservative portion—of 30–39.

† The percentages of this and the preceding paragraph were calculated on the basis of figures given in *ibid.*, pp. 30–34.

they were less than one third as numerous. Of married persons with spouses living there were 139,835 Italians, 75,577 Argentines and 52,701 Spanish.*

In a city where more than four persons in five (81.7 per cent.) aged 50 years or over are of foreign birth, it is not likely that less than four in five persons under 20 years (85.4 per cent.) though described as native are of other than immigrant origin. From the census figures it can, in fact, easily be calculated that the Italian mothers had borne somewhat more than 258,679 children, Spanish mothers more than 82,325 and Argentine mothers 145,361. One more detail is worth adding: among all women married as long as 20–25 years, four fifths had married before the age of 25, and of these one half before 20.†

The main contributions of the municipal census of 1909 may be set forth more briefly. The leading groups were 670,513 Argentines, 277,041 Italians, 174,291 Spanish. Of the Argentines, men and women, half were in the reproductive years 15–50; of the Italians three quarters. Italians aged 40–70 numbered 172,182, Argentines only 133,644—once more an indication of early heavy Italian contributions to the race stock.‡

Of striking value is a table dealing with fecundity. There were more Argentine married women who had had no child or only one child than there were Italian. But more Italian women than Argentine had been mothers of two children and of *each number* of children through "sixteen or more." The 51,984 Argentine mothers (neglecting 3,202 whose number of children was not determined) had given birth to 203,738 children, while the Italian mothers (neglecting 4,768 whose number of children was not determined) had borne 338,555 children.§

What of the rest of Argentina? Buenos Aires city, though embracing a fifth of the population of the republic, cannot claim to be typical. Yet the other populous regions are the cereal regions, where, after all, the Italians have chiefly gone.

* *Ibid.*, pp. 35–39, 64.

† *Ibid.*, pp. 90–101.

‡ Buenos Aires, *General census*, 1909, Vol. I, pp. 37–40. I have calculated the figures.

§ Calculated on basis of figures in *ibid.*, Vol. I, pp. 111, 112. I have had to neglect the indefinite "more" children beyond 16 births.

Of Buenos Aires province we can only say that the Italians are numerous. Of Santa Fé, the second province in population, we have spoken. There are many indications that the Italians are numerous in the interior cities. Rosario grew even faster, before 1895 at least, than Buenos Aires. In the rural sections the Italians were often the largest group. At the beginning of the present century, in the Córdoba colonies, Italian fathers of families were three quarters of all.* In the rural sections, where every arm contributes to the family income, we may be sure that immigrants have been prolific. Indeed, whenever in the Italian consular reports, there is reference to size of families, it is invariably to say that they are large—characteristically, that while one child is being born, another is marrying

Especial interest attaches to the census taken in 1909 by Mendoza, because the circumstances in this province differ broadly from those of either Buenos Aires city or the cereal provinces. There are small towns, and vineyards, and wine-making establishments. The Italians are one eleventh of the population. But their tendency to have large families has here, as elsewhere, asserted itself. Of the 3,426 Italian wives, 658 had been married for 25–50 years. Of these more than two fifths (284) had borne not less than nine children each, and had borne an average of about twelve children. The 284 mothers had had some 3,300 children.†

In view finally of the early coming of the Italians, of their continued coming, and of their rates of reproduction, I believe the figure of 28 per cent., tentatively reached above, for the proportion which they and their children make of the total population of Argentina, to be conservative. Even without including their children's children, it should be raised, and when these are included will surely reach nearer to one third than to one fourth of the population. The rough guess hazarded by Bryce‡ certainly does not seriously overstate the truth: "The Argentine of the future will probably be one third Italian in blood.

* M. E. Río and L. Achával, *Geografía de la provincia de Córdoba* (Buenos Aires, 1904), Vol. II, p. 179.

† Mendoza, *Censo general*, 1909, p. 55. I have calculated the number of children, which remains indefinite because 35 mothers had 16 "or more" children.

‡ *South America—Observations and Impressions* (New York, 1912), p. 438.

HOW TO FIGURE LABOR TURNOVER.

By Frederick S. Crum.

The term *labor turnover* has been variously defined and as its calculation is dependent upon its definition, attention should first be given to just what the term means. So far as I am able to find out from reading an already somewhat extensive literature on the subject, labor turnover was first used and is still most widely used to express the phenomenon of hirings necessary to replace separations in any given industry, establishment or department of an establishment. Before the subject was analyzed too closely, perhaps, by writers of the academic type, labor turnover or the flow of labor in any given industry or establishment, was measured in terms of the average or normal payroll, and it was expressed in the form of percentage of such payroll during the period under observation—usually a week, a month or a year. If the average payroll of a given establishment were 1,000 in a business which required that such payroll be kept at that figure and during a year 500 additions to the payroll were necessary to replace separations therefrom, the yearly labor turnover would be expressed as 50 per cent., or $\frac{500}{1000}$. On an increasing payroll in a growing business the separations from the payroll would still represent the numerator and the average payroll the denominator. On a decreasing payroll in an establishment gradually going out of business, perhaps, or declining from any cause whatsoever, the numerator would be the number hired and the denominator the average payroll, as before. In other words, average payroll by this most generally employed method is always the denominator and the number of employees *replaced* during the period under observation is the numerator in the calculation of *labor turnover.* As this is the older, so, I believe, it is also the best method of measuring labor turnover. Whatever method of calculation is ultimately agreed upon, the statistical problem of *labor turnover* can still be truly stated as Richard B. Gregg has stated it,

namely, as the "measurement of the movement of industrial workers in and out of their employment, and the analysis of its causes and results."

At the National Conference of Employment Managers held in Rochester, N. Y., May 9–11, 1918, a committee was appointed to draft a report which would define labor turnover and state how it should be calculated. The report made by this committee reads as follows:

"Labor turnover for any period consists of the number of separations from service during that period. Separations include all quits, discharges and lay-offs for any reason whatsoever.

"The percentage of labor turnover for any period considered is the ratio of the total number of separations during the period to the average number of employees on the force report during that period. The force report gives the number of men actually working each day as shown by attendance records.

"To compute the percentage of labor turnover for any period, find the total separations for the period considered and divide by the average of the number actually working each day throughout the period."

In brief, this committee advocated the use of attendance force rather than payroll in the calculation of turnover percentages. This seems to have been the main principle advocated in this report, but it is somewhat ambiguous and misleading in some of the statements. For illustration, labor turnover for any period does not necessarily "consist of the number of separations from service during that period." In the current and recent history of shipyard plant construction we find many illustrations of the falsity of this statement. When a shipyard nears completion many of the men engaged for its construction must be laid off from day to day, and these separations do not all represent labor turnover, according to the best and most usual definitions of that term. On a decreasing payroll only the number hired can truly represent replacements or turnover.

The statement that "to compute the percentage of labor turnover for any period, find the total separations for the period considered and divide by the average of the number

actually working each day throughout the period" is to me ambiguous. Probably all that is meant is that the average daily attendance is recommended as the divisor. If so, it does not mean that only those are to be included in the denominator of the fraction who have worked or been in attendance "each day throughout the period." It is conceivable that the turnover in a given year would be represented by infinity in an establishment where no employee could show a record of 100 per cent. attendance. The point in this committee report, however, which challenges discussion is the recommendation that the working force, as shown by attendance records, be made the basis upon which labor turnover is calculated rather than payroll force.

Anyone who has had wide experience in studying comparative labor turnover figures in such an extensive industry as shipbuilding will at once question the validity of this new method apparently advocated by at least some of the employment managers at the National Conference in Rochester, last May (1918). One of the principal objections to it is that attendance is a more fluctuating factor than payroll. On an extremely hot day, 1,000 or more men out of a force of 5,000 might lay off for the one reason "too hot to work." This is not an isolated instance; there are plenty such illustrations in the daily attendance reports of the 160 or more shipyards which it was my privilege to review for a period of eleven months this past year. Heat, cold, blizzard, rain and snow are meteorological conditions which cause wide fluctuations in daily attendance in shipyard and other outdoor employments. Again, an epidemic period such as that we have been experiencing in the shipyards since September, causes most violent fluctuations, daily, weekly and monthly, in the attendance records—much wider variations, quite naturally, than are reflected in the payrolls. In the first week of October, 1918, it was reported that approximately 6,000 out of 19,000 employees of three large shipbuilding plants at Gloucester, N. J., were ill with influenza. Obviously, the resulting temporary low attendance had little or no real relation to labor turnover. Why then, should this attendance factor be used in calculating turnover percentage?

Another objection to the attendance records as a basis for the calculation of labor turnover percentages is that very frequently the separations or quits when recorded are of employees who may not have been in attendance for a day, two days or longer. Theoretically, the payroll is, therefore, a better denominator for the labor-turnover fraction as it always contains the whole labor force, while the attendance force at any given time may range from 100 per cent. of the payroll down to 50 per cent. or even less in severe weather, during an epidemic, obstructed traffic, etc. These latter phenomena, while affecting attendance seriously, may not and often do not affect the payroll or the separations so far as these enter into the labor-force records.

One of the best statements that I have seen advocating payroll in preference to attendance as representing average force for labor turnover calculations is that by Mr. E. Goldberger, efficiency engineer, Packard Motor Car Company, published in the November, 1918, issue of *Industrial Management.* The statement follows:

"The total number of men that have been hired and been paid off, *i. e.*, actually replaced, represents a complete turnover, and if there be an excess of men hired over paid off, they actually are to be accounted to increase in force, while if there be an excess of men paid off, they represent a decrease in force.

"There are more reasons in favor of counting the men on our books rather than those really attending, as some men leave without notice, passing through a transitory stage of not attending and still being on the books, so that, when they leave and are counted in the turnover, they do not represent the turnover of the force working, but of that on our books.

"It is much easier to count the men on the books than those attending, as the first information can be made available quickly in the employment office, while the last one has to be made available by many clerks in different departments or by the time office.

"It is very likely that high wages, where they are unwarranted, will force us to face the problem of absentees, and to study a standard coefficient of attendance. This is, in my

opinion, a good enough reason to keep the same denominator for all three coefficients—labor turnover, labor fluctuation and labor attendance."

The following quotation* also is in conformity with my own point of view, as regards the method of calculating the labor turnover:

What most persons mean by labor turnover is labor replacement. The term labor turnover arose in connection with discussions of the cost of hiring and firing workers. It was recognized that men drifted in and drifted out of industries. Competent men often did not stay, and incompetent men had to be fired after expensive trial. Effective labor service finds the right man for the right job and then gets him to stick. If he does not stick then someone else has to be hired to take his place, or if a mistake in judgment is made and an unfit person employed, then that person has to be fired and another worker found for his job. This is labor turnover but a better and more accurate phrase is to think of it as necessary *labor replacement.*

The National Employment Managers' conference by deciding that the number of employees actually working each day rather than the number appearing upon the payroll should be the proper base for computing labor turnover introduced another factor into personnel fluctuation. This factor, which may be termed *labor variation*, is something different from either plant change or labor replacement.

The number of the working force actually working on any one day is dependent upon sickness and accident, upon explainable absences, and upon habitual loafing usually after pay day. Increasingly, employment offices are keeping records of these daily absences, seeking for the causes of these constant leaks and endeavoring to stop them. But such absences do not mean usually that a man is fired or even that some one is hired to take his place. This labor variation is not labor turnover as the term is ordinarily used. Yet if the daily working force rather than the payroll sheets are used as the base for figuring labor turnover then this element of temporary absences affects to some degree the percentages.

A report then of personnel fluctuation for any period of time should show in percentages the plant change, the labor replacement and the labor variation. These are three distinct elements in the personnel fluctuation. They are due to different causes, require different remedies and should never be confused.

One other subdivision may be desirable. Persons whose places must be refilled leave for avoidable and unavoidable reasons. Among the unavoidable reasons are marriage, death, ill health, retirement, family leaving city, and military service. It is worth while to divide the leavings under labor replacement into avoidable and unavoidable, making separate percentages.

*From "Standardising Labor Turnover" by Harry W. Kimball, *Industrial Management*, December, 1918.

The decrease of the avoidable leavings from week to week, and from year to year, is the true measure of the efficiency of the labor service.

While a record should be kept of all transfers from one department to another within the plant, these transfers should not enter into the calculation of any personnel fluctuation as they do not increase or decrease the working force.

The simplest way of calculating these three elements of personnel fluctuations is by the week, and the simplest base to use is the number on the payroll.

Daily attendance records are extremely important and hours-of-work records, also very important for several purposes, should be available to the manager of a plant or establishment, but I seriously doubt their utility in the calculation of labor turnover. Payroll measured against daily attendance gives a reasonable notion of the percentage and total amount of absenteeism. Such ratios could be computed weekly, monthly, quarterly and yearly. In other words, daily attendance should preferably be considered as a coefficient of payroll. Among shipbuilders, for the country as a whole, approximately 85 per cent. of the average payroll was in daily attendance. There were wide variations, however, from this figure when individual yards, different sections of the country and the different seasons of the year were considered.

For a proper measurement of daily attendance good payroll records must be freshly available and, if available, there would appear to be no good reason why labor turnover should not be measured against payroll rather than against attendance—a more widely fluctuating, and at least as regards *labor flow* a more artificial factor than payroll. Perhaps one objection to the use of payroll records is that they sometimes are not cleared frequently enough. This is not a valid objection in labor turnover calculations, for the net gain or loss in the payroll is readily obtained when the number hired and the number of separations are known for a given period. An effort should be made to bring about standard and uniform practice in the keeping of all labor or work-time records, and payroll records unquestionably should be more uniform and accurate than at present. Probably the most generally feasible plan would be to have the payrolls cleared at least twice a month,

preferably, perhaps, on the first and fifteenth of each month. Such payroll figures would, I believe, give an excellent basis from which to calculate labor turnover or replacement percentages, labor fluctuations, and daily attendance. If the payroll were cleared weekly the accuracy of the calculations would, of course, be somewhat greater.

Unless some sound standard as to the factors which shall be used in calculating labor turnover is adopted and applied generally at an early date, there will be created a still greater statistical chaos than already exists. At present not only is there no universally or even generally recognized method of calculating labor turnover, but there is also an "utter lack of any standards in estimating cause, extent and cost of labor turnover."*

An efficient employment manager is probably the first and most important step in any effort to bring about stability in the labor force of an industrial plant. The employment manager can perhaps best demonstrate his efficiency by pointing to the reduction of the labor turnover under scientific as compared with the previous and presumably unscientific "hire and fire" method of foremen. To the employment manager, therefore, it is important that his methods of calculating labor turnover shall be uniform and on a basis that can be defended by sound common sense and logic.

Labor turnover should be measured for the principal departments of any given plant as well as for the plant as a whole. Transfers from one department to another would enter into the labor turnover of the departments affected, but such transfers would not count in the labor turnover of the whole plant. In the United States there is a large amount of interstate migration but these migrants are not added to the statistics of immigrants and emigrants for the United States. The analogy illustrates how transfers should be handled. The labor turnover of the departments of any given plant if summed would show too large a labor turnover for the plant as a whole, provided there had been interdepartmental transfers.

Turnover figures are valuable only as they are used and

*"An Initial Survey of the Problem of Labor Turnover," Confidential Reports Series, Report No. 1, The National Association of Corporation Schools.

understood by the employment manager and by the plant management as an index to the labor conditions. When the labor turnover figures are reduced to simple percentages which always have definite significance, the management will get light upon many problems, the solution of which is necessary to effect a reduction in turnover. As the necessary remedies are applied the labor turnover percentage furnishes an index of the result of the remedies. A few of the many partial solutions of the big problem of turnover are profit-sharing, bonus payments, group insurance, other insurance provision for employees such as disability allowances, pensions, etc., good restaurant facilities, quick promotions for the most capable, careful fitting of the employee to the job, etc.

Mere expression of labor turnover in percentages will never solve the problem, but a simple mathematical statement of its size is likely to persuade the manager that it is important to seek for the causes why men leave in such large numbers. Next, he is apt to study the cost of turnover and, finally, he will be in a position to justify to himself or to the owner of the business that it is better to spend money for preventive measures than for the wasteful and reckless hiring and firing methods so usual in American business. The mathematical formula of labor turnover will thus be transformed into a better understanding of the human element, with the result that the average length of service of the employees will be considerably extended and the labor turnover correspondingly reduced, to the great and mutual advantage of employer and employees.

ILLUSTRATIONS OF LABOR TURNOVER CALCULATIONS.

For an increasing payroll the following example will illustrate the method when payrolls and changes in same are available in weekly reports. Some months will embrace five weeks and others four. Any given week should be included in that month which embraces four or more of its days. When five weeks are included in a given month the turnover percentage for the month must be mutiplied by 10.4 to reduce it to a yearly basis, and when only four weeks are included the factor for multiplication is 13.

INCREASING PAYROLL.

Week Ending	Payroll	No. Hired	No. Lost	No. Replaced	Labor Turnover Percentage	
					Weekly	Yearly
Oct. 5, 1918...	2,593	37	15	15	.58	30.1
Oct. 12, 1918...	2,615	42	17	17	.65	33.8
Oct. 19, 1918...	2,640	26	19	19	.72	37.4
Oct. 26, 1918...	2,647	17	20	17	.64	33.4
Nov. 2, 1918...	2,644	22	18	18	.68	35.4
Total.....	13,139	142	89	89	3.39	35.2
Average Payroll	2,628					

In this example the fundamental data are assumed to be available, week by week, and the establishment is assumed to be a growing one with weekly additions to the force generally larger than the subtractions from all causes whatsoever. In this example the weekly percentages of turnover varied only slightly, or from *.58* to *.72*. Multiplying the weekly turnover percentages by 52 reduces them to a yearly basis. For the month ending November 2 the turnover percentage was 3.39. As the period was really five weeks, or 10.4 part of a year, the turnover percentage reduced to a yearly basis is 3.39 multiplied by 10.4, or 35.2.

In the next example the week ending October 26 is purposely shown as indicating a greater loss than gain in the payroll. The replacements for that week represent the number hired rather than the number lost, or 17 rather than 20. For the five weeks as a whole, however, the number hired are in excess of the separations so in the totals the 20 is included as replacements. When large numbers of industrial establishments are being followed week by week, as is done in the Emergency Fleet Corporation, the weekly turnover percentage is a valuable index of the general trend of this phase of the labor problem. It should also serve a useful purpose in any industrial establishment. The payroll, however, should be cleared weekly, if feasible, and at worst, not less often than every two weeks if the labor turnover is to be calculated with a close approximation to exactness.

DECREASING PAYROLL.

Week Ending	Payroll	No. Hired	No. Lost	No. of Replacements	Turnover Weekly	Percentage Yearly
Oct. 5, 1918...	6,754	70	95	70	1.04	53.9
Oct. 12, 1918...	6,729	47	83	47	.70	36.3
Oct. 19, 1918...	6,693	27	78	27	.40	21.0
Oct. 26, 1918...	6,642	50	45	45	.68	35.2
Nov. 2, 1918...	6,647	39	60	39	.59	30.5
Total.....	33,465	233	361	233	3.48	36.2
Average Payroll	6,693					

In this example the payroll is fairly continuously diminishing. In such instances the number hired rather than the number of separations represent the turnover for only such losses are replaced as are represented by number hired during the period under observation. During the five-weeks period, in the example, obviously the turnover percentage is represented by 233, the number hired, divided by 6,693 the average payroll, or 3.48. The factor 3.48 multiplied by $\frac{52}{5}$, or 10.4, gives 36.2 as the labor turnover percentage, yearly basis.

During the week ending October 26, 50 men were hired as against 45 lost from the payroll. In the calculation of the weekly turnover percentage for that week, the number of replacements must be considered as 45, therefore, and not 50, although the 50 should be used when calculating the turnover for the five-weeks period.

If labor turnover percentages are to be calculated only on a monthly basis, the payroll should preferably be given for the first and fifteenth of the month so as to get as true an average or mean payroll as possible. If this is not feasible the next best thing is the payroll at the beginning and end of each month from which approximate means can be derived for each month by taking the sum of the two numbers and dividing by two.

The simplest formula for labor turnover and one which will serve every practical purpose is as follows:

$$T = \frac{R}{\frac{P_1 + P_2 + P_3 + - P_n}{N}}.$$

In this formula:

T = Turnover.
R = Replacements, or number hired to replace losses.
P = Payroll.
N = Number of Payrolls used in striking an average for the period under observation.

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ANALYSIS OF THE STANDARD OF LIVING IN THE DISTRICT OF COLUMBIA IN 1916.*

By William F. Ogburn.

At the close of the year 1916, the U. S. Bureau of Labor Statistics collected over two thousand budgets of families living in the District of Columbia showing details of expenditures for the calendar year 1916. An analysis of these budgets was published in the "Monthly Review of the U. S. Bureau of Labor Statistics" for October and November, 1917. It is the purpose of this paper to show a somewhat more detailed analysis of this study in order to bring out more nearly complete information concerning the lives and habits of these families, than appears in a brief analysis. In doing this, it is also the purpose of this paper, to use a method which not only presents rather full information with considerable brevity, but generalizes from the sample in such a form as to permit a large number of comparisons, and to make a number of detailed estimates and predictions.

The budgets were collected in such a manner as to be representative of the community as a whole for families of low and moderate incomes. They were from the black and white races and included a variety of nationalities and occupations. There was no limitation as to size and constituency of the family. Families with incomes over $2,000 a year for others than wage earners were excluded; as were also families in which the husband earned less than 75 per cent. of the total income. The budgets were collected in a house-to-house canvas by agents. Of these 2,110 budgets 200 were selected for the purpose of this analysis. The selection was of white families comprising at least a man and wife living in rented houses without lodgers, boarders or adults, other than children. Also only those schedules were chosen which contained full detailed data on expenditures for sundries. This selection yielded only 200 cases. About 90 different occupations were represented, distributed among the unskilled, the semi-skilled, and the skilled trades, as well as among other occupations as clerks and salesmen.

* Paper read at the Eightieth Annual Meeting of the American Statistical Association.

What we really want to know about such budgetary studies is how the expenditure for various items varies with the size of the income and with the size of the family. The problem of analysis consists, then, of classifying the various items of expenditure by income and by size of the family. The items of expenditure studied in this analysis are food, rent, fuel and light, clothing, sundries, husband's clothing, wife's clothing, children's clothing, insurance, furniture and furnishings, contribution for religious purposes, education, amusement, liquor and tobacco and sickness. Various relationships may also be shown between these items of expenditure. A list of the variables, their definition and designation, used in these relationships follows.

DEFINITION OF VARIABLES.

X_1 = Annual income of family for a year in dollars, and includes earnings from garden, earnings of wife, if any, and all other income, including gifts.

X_2 = Deficit or surplus, and is the difference between income and expenditure. Expenditure includes the total for the same year for which income is computed, and includes unpaid bills, such as doctors' bills. A deficit is listed with a minus sign and a surplus with a plus sign.

X_3 = Size of family, as measured in units of an adult male, based on food consumption. The U. S. Bureau of Labor Statistics scale is used, which rates a woman as 0.9 of an adult male, child (11 to 14) as 0.9, child (7 to 10) as 0.75, child (4 to 6) as 0.4, and child (to 3) as 0.15. A further discussion of this measure of size of family is found in a later paragraph.

X_4 = Percentage of total expenditure spent for *food* in a year for a whole family, and includes confectioneries, lunches taken out, and ice.

X_5 = Percentage of total expenditure spent for *rent* in a year for the whole family. If two or more houses were lived in, the rents for each fraction of a year were totaled. Owned houses and houses in which lived lodgers or boarders with the family were not included. Rent does not include fuel and light (except in four cases).

X_6 = Percentage of total expenditure spent for *fuel and light* in a year for the whole family.

X_7 = Percentage of total expenditure spent for *clothing* for the whole family. No family includes others than man, wife and children, and at least every family had a man and wife.

X_8 = Percentage of total expenditure spent for *sundries*. Sundries means all expenditures other than expenditures for food, rent, fuel and light, and clothing. It includes insurance, dues to organizations, payments for religion, amusement, education, sickness, furniture and furnishings, and expenses for various incidentals and exigencies.

X_9 = Percentage of total expenditure spent on *husband's clothing*.

X_{10} = Percentage of total expenditure spent on *wife's clothing*.

X_{11} = Percentage of total expenditure spent on *children's clothing*.

X_{12} = Percentage of total expenditure spent for *insurance* of all kinds, including fraternal, industrial and "old line" insurance.

X_{13} = Percentage of total expenditure that went to institutions or organizations of *religion*.

X_{14} = Percentage of total expenditure spent for *furniture and furnishings*. In cases of furniture bought on the installment plan, the installments which are paid and are due during the year are included.

X_{15} = Percentage of total expenditure spent on *education*. Educational expenditures include in this study essentially, newspapers, books, magazines and school expenses of children of high school age. Education is a somewhat inaccurate descriptive term for the items of expenditure included here.

X_{16} = Percentage of total expenditure spent for *amusement*, including movies, theatres, dances, pool, etc. Amusement generally is a much broader term than is here suggested by these particular items of expenditure.

X_{17} = Percentage of total expenditure for *liquor and tobacco*. At this time it was legal to sell liquor in Washington.

X_{18} = Percentage of total expenditure spent for *sickness*. This includes unpaid doctors' bills incurred during the year, also medicines, drugs, nurse and hospital expenses. The meaning of the correlations involving amount spent for sickness is not clear for the amount spent for sickness does not necessarily, indicate the number of days of sickness.

X_{19} = Total clothing expenditure in multiples of the amount spent for the husband's clothing, and is found by dividing the expenditure for man's clothing into the total expenditure of clothing. These ratios are studied for the purpose of supplementing the information gathered from the indexes of equivalent adult males in food consumption as to validity of these figures as indexes of the size of the family.

X_{20} = *Cost per adult male per day* in food consumption, and is determined by dividing the total yearly family food bill by 365 and then by dividing by the number of equivalent adult males in food consumption in the family.

Table I shows how the data may be classified. In this table, the percentage of expenditure for food is classified according to families of various incomes. This table shows therefore the relationship between income and percentage of expenditure for food. Similarly the relationship between income and the various other items of expenditure have been analyzed, the tables not being presented here. Also the percentages of expenditure for various items of the family budget have been classified, according to size of family in similar tables, and other tables have been constructed showing various relationships.

TABLE I.

RELATIONSHIP BETWEEN SIZE OF ANNUAL INCOME AND PERCENTAGE OF TOTAL ANNUAL EXPENDITURE SPENT FOR FOOD.

	500–	600–	700–	800–	900–	1000–	1100–	1200–	1300–	1400–	1500–	1600–	1700–	1800–	1900–	2000–	2100–	2200–	
20–	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1
22–	..	..	1	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..	4
24–	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1	1	..	..	4
26–	..	..	..	1	..	..	..	1	..	..	2	..	..	..	1	..	..	..	5
28–	..	..	..	..	1	1	1	1	..	2	1	..	..	..	..	..	..	1	8
30–	..	1	..	..	..	1	..	..	..	2	2	1	..	..	..	..	..	..	7
32–	..	..	..	1	1	..	2	2	4	1	2	2	1	1	..	..	..	..	17
34–	..	..	2	2	..	1	..	1	..	3	3	1	..	..	..	..	..	..	13
36–	..	1	..	2	1	3	..	4	..	2	..	..	..	..	..	..	..	..	13
38–	..	1	1	2	4	3	2	2	1	3	3	..	..	..	..	..	..	..	22
40–	..	1	..	5	1	2	5	4	3	3	1	..	1	..	..	..	..	..	26
42–	1	1	1	3	3	..	1	3	1	1	1	..	..	..	..	..	..	..	16
44–	..	1	3	1	2	1	..	1	..	2	1	2	..	..	..	..	..	..	14
46–	2	1	5	3	1	..	1	..	3	1	..	..	1	..	..	..	..	..	18
48–	1	1	4	1	2	..	..	1	..	..	..	..	..	..	..	..	..	..	10
50–	..	2	3	2	2	1	..	1	1	..	..	..	..	1	..	..	..	..	13
52–	..	1	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3
54–	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
56–	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
	4	12	24	25	18	13	13	21	13	22	17	8	4	2	2	1	..	1	200

Only one of these tables showing relationships is included in this report, but in Table II an abbreviated or condensed description of these various tables of relationships is shown. Table II contains a list of the correlation coefficients measuring these relationships. Thus we see that the correlation coefficient between income and percentage of expenditure for food is high, $r_{1\cdot4} = -0.513$, while the correlation coefficient between income and percentage of expenditure for rent is low, $r_{1\cdot5} = -0.10$. These coefficients tell us that the size of the income affects only slightly percentages of expenditure for rent, while increasing the income markedly diminishes the percentage of expenditure for food. And so the various relationships can be interpreted from the correlation coefficients.

TABLE II.

CORRELATION COEFFICIENTS.

$r_{2\cdot1} = +0.354$	$r_{3\cdot6} = -0.196$
$r_{3\cdot1} = +0.047$	$r_{4\cdot6} = +0.256$
$r_{4\cdot1} = -0.513$	$r_{5\cdot6} = -0.075$
$r_{5\cdot1} = -0.10$	$r_{6\cdot6} = +0.028$
$r_{6\cdot1} = -0.227$	$r_{7\cdot6} = +0.165$
$r_{7\cdot1} = +0.351$	$r_{8\cdot6} = -0.255$
$r_{8\cdot1} = +0.419$	$r_{9\cdot6} = -0.286$
$r_{9\cdot1} = +0.229$	$r_{10\cdot6} = +0.438$
$r_{10\cdot1} = +0.368$	$r_{11\cdot6} = +0.692$
$r_{11\cdot1} = +0.071$	$r_{12\cdot6} = +0.011$
$r_{12\cdot1} = -0.022$	$r_{13\cdot6} = -0.0284$
$r_{13\cdot1} = +0.175$	$r_{14\cdot6} = -0.115$
$r_{14\cdot1} = +0.10$	$r_{15\cdot6} = +0.0038$
$r_{15\cdot1} = +0.304$	$r_{16\cdot6} = -0.147$
$r_{16\cdot1} = +0.265$	$r_{17\cdot6} = -0.029$
$r_{17\cdot1} = -0.122$	$r_{18\cdot6} = -0.078$
$r_{18\cdot1} = -0.036$	$r_{19\cdot6} = +0.405$
$r_{19\cdot1} = -0.046$	$r_{20\cdot6} = -0.639$
$r_{20\cdot1} = +0.391$	

Although the correlation coefficients show the results of the classification of items of expenditure according to income and according to size of family, perhaps a better idea can be had by expressing these relationships in equations rather than in coefficients. These equations can best be explained by observing the plotting in Diagram I.* In this chart we see from the location of the circular dots the average amount of deficit or surplus, according to size of income. The procession of circular dots shows that for very low incomes there is a large deficit and that as the income increases the deficit becomes less

*This diagram was not available for the QUARTERLY, but will be published in another edition of the Author's work.—ED.

and less, and soon there is a surplus which increases with the income. There is considerable fluctuation of these circular dots or means, due to the fact that the sample includes only 200 cases. If the sample had been very large the procession of the means would have approximated with less fluctuation a straight line. We can determine the equation to the straight line which the dots follow. It is $X_2 = -166.45 + 0.144\ X_1$ and the plotting of it is shown in Diagram I. This "regression" equation expresses the relationship between size of income and the amount of deficit or surplus in somewhat more interpretable form than does the correlation coefficient. Thus the equation tells us that for every increase of $100 in income a year the amount of deficit is reduced $14 or the surplus is increased $14. We can also substitute in this equation any income (between $800 and $1,800 a year) and know what on the average is the amount of deficit or surplus of a family living in the District of Columbia in 1916. These results can also be read from the plotting of the line in the diagram. Thus when the income was $1,500 there was on the average a surplus of $50 and when the income was $1,155 there was, on the average, neither deficit nor surplus. Similarly the other equations in Table III show the relationship existing between the other variables.

TABLE III.

REGRESSION EQUATIONS.

$X_2 = -166.45 + 0.144X_1$	$X_3 = 81.09 - 24.22X_2$
$X_3 = -3.23 + 0.00016X_1$	$X_4 = 34.31 + 1.71X_2$
$X_4 = 53.08 - 0.0113X_1$	$X_5 = 20.66 - 0.297X_2$
$X_5 = 21.14 - 0.0013X_1$	$X_6 = 5.52 + 0.05X_2$
$X_6 = 7.19 - 0.0013X_1$	$X_7 = 9.03 + 0.496X_2$
$X_7 = 6.70 + 0.0035X_1$	$X_8 = 30.06 - 1.80X_2$
$X_8 = 12.70 + 0.0098X_1$	$X_9 = 5.30 - 0.47X_2$
$X_9 = 2.21 + 0.0013X_1$	$X_{10} = 4.73 - 0.635X_2$
$X_{10} = 0.50 + 0.0018X_1$	$X_{11} = -0.80 + 1.57X_2$
$X_{11} = 3.94 + 0.00053X_1$	$X_{12} = 4.03 + 0.024X_2$
$X_{12} = 4.29 - 0.00016X_1$	$X_{13} = 1.01 - 0.026X_2$
$X_{13} = 0.30 + 0.00054X_1$	$X_{14} = 4.07 - 0.34X_2$
$X_{14} = 1.81 + 0.00096X_1$	$X_{15} = 0.77 + 0.0023X_2$
$X_{15} = 0.10 + 0.00059X_1$	$X_{16} = 1.44 - 0.129X_2$
$X_{16} = 0.12 + 0.00077X_1$	$X_{17} = 1.97 - 0.055X_2$
$X_{17} = 2.65 - 0.00076X_1$	$X_{18} = 3.85 - 0.24X_2$
$X_{18} = 3.44 - 0.00036X_1$	$X_{19} = 0.81 + 0.85X_2$
$X_{19} = 4.08 - 0.00032X_1$	$X_{20} = 0.62 - 0.069X_2$
$X_{20} = 0.23 + 0.00014X_1$	

Observation of the list of equations in Table III shows them to be equations of straight lines. In other words, we have

assumed that the circular dots or the means, if the sample had been sufficiently large, would have fallen on a straight line. Of course, there is no *a priori* reason why the means should follow a straight line rather than a curved line, or any other kind of line. Observation, however, of the plotting of the means of the various tables of relationships seems to show that they follow approximately a straight line, at least for incomes from $800 to $1,800. The number of cases of incomes beyond these limits are quite small and the scattering for the very low and very high incomes is quite marked. The present study is therefore most accurate for families with incomes between $800 and $1,800. In some tables the means for very high incomes seem not to follow a straight line. Thus in Diagram I in the case of size of deficit or surplus, according to size of income, perhaps the line best fitting the means would be a straight line up to $1,700 and then curving upward slightly. In most of the relationships studied, though, the straight line is a better fit than is true in the case of the data in Diagram I. However, in this diagram the straight line gives a considerably better description than the rough plotting of the means. Thus according to the means, when the income is $1,150 there is a deficit of $61, but according to the equation of the line there is no deficit or surplus when the income is $1,150. In other words, the true amount of deficit or surplus is more nearly indicated by the line than by the means, because the means fluctuate a good deal for the reason that the sample is small. So that even if the straight line is not a perfect fit, the fit is sufficiently good to give a good description. This statement is shown to be true by the following list of tests of "goodness of fit," shown in Table IV. A customary measure of the extent of divergence of the means from a straight line is the difference between the correlation ratio and the correlation coefficient, or, better still, the difference between their squares, which is usually written as ζ. If the ζ is large the fit is not very good. The size of the ζ can be estimated by comparison with its error. If three times the error is less than ζ, it is fairly certain that the straight line is not a good fit. So by comparing in Table IV the ζ's with their errors, an estimate may be made of the "goodness of fit" of a straight line to the means, for each of the relationships studied. The errors of ζ were derived from the formula, $\epsilon_\zeta = 2\sqrt{\frac{\zeta}{n}}$.

TABLE IV.

DIFFERENCES BETWEEN THE CORRELATION RATIO SQUARED AND THE CORRELATION COEFFICIENT SQUARED AND THE ERROR OF THIS DIFFERENCE.

$\zeta_{2\cdot1}=0.1905$	$\epsilon_{2\cdot1}=0.0616$	$\zeta_{2\cdot3}=0.090$	$\epsilon_{2\cdot3}=0.042$
$\zeta_{3\cdot1}=0.0633$	$\epsilon_{3\cdot1}=0.0356$	$\zeta_{4\cdot3}=0.053$	$\epsilon_{4\cdot3}=0.033$
$\zeta_{4\cdot1}=0.0338$	$\epsilon_{4\cdot1}=0.026$	$\zeta_{5\cdot3}=0.1026$	$\epsilon_{5\cdot3}=0.045$
$\zeta_{5\cdot1}=0.037$	$\epsilon_{5\cdot1}=0.0272$	$\zeta_{6\cdot3}=0.059$	$\epsilon_{6\cdot3}=0.034$
$\zeta_{6\cdot1}=0.043$	$\epsilon_{6\cdot1}=0.0294$	$\zeta_{7\cdot3}=0.098$	$\epsilon_{7\cdot3}=0.044$
$\zeta_{7\cdot1}=0.0574$	$\epsilon_{7\cdot1}=0.0338$	$\zeta_{8\cdot3}=0.059$	$\epsilon_{8\cdot3}=0.034$
$\zeta_{8\cdot1}=0.0596$	$\epsilon_{8\cdot1}=0.034$	$\zeta_{9\cdot3}=0.127$	$\epsilon_{9\cdot3}=0.052$
$\zeta_{9\cdot1}=0.1554$	$\epsilon_{9\cdot1}=0.056$	$\zeta_{10\cdot3}=0.065$	$\epsilon_{10\cdot3}=0.036$
$\zeta_{10\cdot1}=0.0892$	$\epsilon_{10\cdot1}=0.042$	$\zeta_{11\cdot3}=0.0409$	$\epsilon_{11\cdot3}=0.028$
$\zeta_{11\cdot1}=0.0717$	$\epsilon_{11\cdot1}=0.038$	$\zeta_{12\cdot3}=0.0834$	$\epsilon_{12\cdot3}=0.04$
$\zeta_{12\cdot1}=0.0718$	$\epsilon_{12\cdot1}=0.038$	$\zeta_{13\cdot3}=0.0699$	$\epsilon_{13\cdot3}=0.036$
$\zeta_{13\cdot1}=0.0605$	$\epsilon_{13\cdot1}=0.034$	$\zeta_{14\cdot3}=0.0847$	$\epsilon_{14\cdot3}=0.04$
$\zeta_{14\cdot1}=0.0639$	$\epsilon_{14\cdot1}=0.036$	$\zeta_{15\cdot3}=0.0324$	$\epsilon_{15\cdot3}=0.0254$
$\zeta_{15\cdot1}=0.0474$	$\epsilon_{15\cdot1}=0.0308$	$\zeta_{16\cdot3}=0.029$	$\epsilon_{16\cdot3}=0.024$
$\zeta_{16\cdot1}=0.1349$	$\epsilon_{16\cdot1}=0.052$	$\zeta_{17\cdot3}=0.0407$	$\epsilon_{17\cdot3}=0.028$
$\zeta_{17\cdot1}=0.022$	$\epsilon_{17\cdot1}=0.021$	$\zeta_{18\cdot3}=0.0315$	$\epsilon_{18\cdot3}=0.025$
$\zeta_{18\cdot1}=0.0816$	$\epsilon_{18\cdot1}=0.04$	$\zeta_{19\cdot3}=0.042$	$\epsilon_{19\cdot3}=0.029$
$\zeta_{19\cdot1}=0.0288$	$\epsilon_{19\cdot1}=0.024$	$\zeta_{20\cdot3}=0.0775$	$\epsilon_{20\cdot3}=0.0394$
$\zeta_{20\cdot1}=0.079$	$\epsilon_{20\cdot1}=0.04$		

The correlation coefficients and the regression equations may at times give misleading information, for the reason that they measure the relationship between only two variables, whereas there may be a very important third variable related, which must be taken into consideration before we can get the real meaning. For instance, we see from the fact that $r_{3\cdot2}=-0.196$, in Table II, that the larger the family the less the surplus or the greater the deficit. But we know that the size of the income has a good deal to do with whether there is a surplus or a deficit. What we really want to know is what is the degree of correlation between size of family and deficit or surplus for a constant income. The coefficient $r_{3\cdot2}$ doesn't tell us anything about the income; but we can find out the relationship between size of family and deficit or surplus with a constant income, by using the method of partial correlation. Using this method we find ${}_1r_{3\cdot2}=-0.228$, in Table V, which means that with a constant income the correlation between income and deficit or surplus is somewhat greater than when we measure the correlation, irrespective of whether the income is constant.

Taking another illustration, we see from the fact that $r_{3\cdot15}=+0.0038$, that the larger the family the more is spent for such educational purposes as newspapers, magazines and

books. But we also know that the larger the income the more is spent for such purposes. Now if larger families have larger incomes, the correlation $r_{3.15}$ instead of showing that larger families spend more for educational purposes *may* mean really that families with larger incomes spend more for educational purposes, because large families have larger incomes. This seems to be the case for $r_{1.3}$ (income and size of family) equals $+0.047$, and $r_{1.15}$ (income and education) equals $+0.0304$, and the partial correlation coefficient ${}_1r_{3.15}$, a correlation between size of family and percentages of expenditures for educational purposes with a constant income, equals -0.011. In other words, with the income unchanged, an increase in family is accompanied with a smaller percentage of expenditures for newspapers, magazines and books, which is the opposite of what seemed to be the case when we considered the relationship between income and expenditure for these purposes, considering income as a factor ($r_{3.15} = +0.0038$). The correlations just considered are very small but they illustrate the idea in partial correlation.

From these illustrations it is seen that we really want to know the relationships between income and expenditure for various purposes, with the size of the family kept constant, and also the relationships between size of family and expenditure for various purposes, with the income kept constant. The partial coefficients of correlation in Table V give us this information, and are therefore less misleading in information than the simple correlation coefficients.

The part of the list of partial coefficients of correlation between income and various items of expenditure with the size of the family kept constant, is a sort of chart showing the satiability of human wants. Where the sign of the correlation coefficient is negative the desires seem to be more quickly satisfied, while the large positive correlations indicate the desires that are capable of somewhat greater expansion. Thus the desire for food is not capable of very great expansion and $r_{1.4} = -0.513$. This is not so true of the desire for clothes and in this case $r_{1.7} = +0.351$.

Also the latter half of the list of partial coefficients of correlations, showing correlations between size of family and various expenditures with an income kept constant, is a very

TABLE V.

PARTIAL CORRELATION COEFFICIENTS.

$r_{87.1} = +0.371$
$r_{84.1} = -0.544$
$r_{85.1} = -0.0965$
$r_{86.1} = -0.228$
$r_{87.1} = +0.340$
$r_{88.1} = +0.447$
$r_{89.1} = +0.253$
$r_{710.1} = +0.432$
$r_{711.1} = +0.0542$
$r_{712.1} = -0.022$
$r_{713.1} = +0.177$
$r_{714.1} = +0.106$
$r_{715.1} = +0.305$
$r_{716.1} = +0.275$
$r_{717.1} = -0.121$
$r_{718.1} = -0.033$
$r_{719.1} = -0.03$
$r_{720.1} = +0.549$
$r_{17.23} = -0.228$
$r_{17.24} = +0.327$
$r_{17.25} = -0.0708$
$r_{17.26} = +0.039$
$r_{17.27} = +0.159$
$r_{17.28} = -0.302$
$r_{17.29} = -0.305$
$r_{17.20} = -0.49$
$r_{17.11} = +0.6925$
$r_{17.12} = -0.012$
$r_{17.13} = -0.0375$
$r_{17.14} = -0.121$
$r_{17.15} = -0.011$
$r_{17.16} = -0.165$
$r_{17.17} = -0.242$
$r_{17.18} = -0.076$
$r_{17.19} = +0.408$
$r_{17.20} = -0.7157$
$r_{1.8718} = -0.182$
$r_{1.8719.16} = +0.239$
$r_{1.8719.17} = -0.073$
$r_{1.8719.18} = -0.081$
$r_{1.8719.23} = -0.0822$
$r_{1.8719.24} = +0.054$
$r_{1.8719.25} = -0.121$
$r_{1.8719.26} = -0.138$
$r_{1.8719.27} = +0.046$

good indication of what happens when the family increases and the income does not. The negative coefficients of correlations show the particular curtailment and the degree of curtailment that is made necessary. The information of this table no doubt helps to explain why the birth rate has declined.

Several references have been made to correlating the size of the family, and no doubt the question has arisen in the mind of the reader as to what measure of the size of the family was used. In order to classify according to size of family, it was necessary to find some measure of the size of the family other than the number of persons in the family. A somewhat better unit is that used in analysis of food consumption, in which children and women are considered as various fractions of an adult male; the particular fractions are determined on the basis of the respective calory requirements of the particular individuals. Thus, the Bureau of Labor Statistics rates the adult male as 1.0, the wife as 0.9, child over 14 years as an adult, child from 11 to 14 years as 0.9, child from 7 to 10 years as 0.75, child from 4 to 6 years as 0.4 and child under 3 years as 0.15. This scale is certainly a better unit of measure of the size of the family than the number of persons in the family. Such a scale has been accepted as an index of the size of the

family when studying food requirements and food expenditures. But is it also a good index of the size of family when studying clothing expenditures, rent, expenditures for fuel, light and sundries?

It is possible to find out what is the proportion of expenditure for clothing for the wife and for children of various ages, as compared with the proportion for the adult male. If this is done we can then compare the fractions which the children's and wife's clothing is of the adult male's with the fractions which the children's and wife's calory requirements is of the adult male's requirements. This will furnish an idea of whether the unit of measure of size of family, based on food requirements, is a good measure when we study clothing expenditure. This has been done and has been generalized in such a way as to show on the average what size a family will be when measured in units of clothing expenditure in terms of the adult male as compared with the same family expressed in units of calory requirements in terms of the adult male. These data show a very close correspondence between these two units of measure for size of family, as shown in the equation $X_{19}=0.81+0.85X_3$. Thus when the equivalent adult males in calory requirements are 3, the total clothing expenditure in multiple of the expenditure for the husband's clothes is on the average 3.3, when the equivalent adult males in calory requirements are 4, the corresponding figure in clothing requirements is 4.2, when the equivalent adult males in calory requirements are 5, the corresponding figure in clothing requirements is 5.1, and where the equivalent adult males in calory requirement are 6, the corresponding figure in clothing requirements is 5.9.

This relationship can be expressed in the following terms: when the size of the family, measured in these units based on food requirements, is increased by 1 unit, the average size of the family in units based on clothing expenditures is increased on the average by 0.85 units. We think then that the units of equivalent males, based on food needs, is a good measure of the size of the family, when considering clothing expenditures. These two expenditures include more than 50 per cent. of the total expenditures.

In a recent article in the U. S. Public Health Reports* the authors discuss the unit of the measure of the size of the family and state that a study was made in 1917 among families in cotton mill villages, but that "while the tabulations of these data have not been completed it is indicated that the Atwater scale is roughly indicative of the variations, according to sex and age in the consumption of all articles for which there are individual expenditures." In this article there is also a table computed from data collected by the U. S. Bureau of Labor Statistics in 1911, which shows that the expenditures of other members of the family bear about the same ratios to the husband's expenditure as their calory requirements do to the calory requirements of the husband, thus strengthening the value of the calory scale as a measure of the size of the family. So in this study of the District of Columbia the calory scale of the U. S. Bureau of Labor Statistics was used as a measure of the size of the family.

Just as the correlation coefficients did not yield the information they appeared at first glance to yield, because of the disturbance of other factors, income and size, and it was found desirable to determine the partial coefficients of correlation which showed a relationship when these disturbing factors were kept constant; so the regression equations may be slightly deceptive at first glance, and we need to determine the partial regression equations. For instance from equation, $X_{11} = 3.94 - 0.00053\ X_1$, in Table III, we see that an increase of income of $100 increases the average percentage of expenditure for children's clothing by 0.053 per cent., but it may be that with the size of the family kept constant, the increase in percentage of expenditure for children's clothing for every $100 increase in income will not be so much. And this is true, for from equation, $X_{11} = -1.17 + 0.000286\ X_1 + 1.58\ X_3$, in Table VI, an equation in such a form that we can keep the factor, size of family, constant, we see that for every increase in income of $100 the percentage of expenditure for children's clothing increases only 0.0286 per cent., or about one half what appeared to be the increase when we did not keep the size of the family

* "Disabling Sickness among the Population of Seven Cotton Mill Villages of South Carolina in Relation to Family Income," by Sydenstricker, Wheeler, and Goldberger. Vol. XXXIII, No. 47, November 22, 1918.

constant. These partial regression equations enable us to keep the size of the family constant and tell what percentage of increase (or decrease) accompanies a change of income of any amount. Similarly, they enable us to keep the size of income constant and tell what percentage of increase (or decrease) accompanies a change of any size in the family. These equations then give us the maximum amount of accurate specific information about items of expenditure for various sizes of income and various sizes of family. In other words, we can tell from these equations what a family of any size with an income of any size (between $800 and $1,800) spends, on the average, on the various items of expenditure studied in the year 1916 in the District of Columbia.

TABLE VI.

PARTIAL REGRESSION EQUATIONS.

(1)	$X_2 = -82.70 + 0.14921X_1 - 26.31X_3$	(Deficit and surplus)
(2)	$X_4 = 47.00 - 0.01158X_1 + 1.88X_3$	(Food)
(3)	$X_5 = 22.03 - 0.00125X_1 - 0.28X_3$	(Rent)
(4)	$X_6 = 7.00 - 0.00134X_1 + 0.066X_3$	(Fuel and light)
(5)	$X_7 = 5.29 + 0.003407X_1 + 0.449X_3$	(Clothing)
(6)	$X_8 = 19.00 + 0.01008X_1 - 1.94X_3$	(Sundries)
(7)	$X_9 = 3.88 + 0.00134X_1 - 0.50X_3$	(Husband's clothing)
(8)	$X_{10} = 2.69 + 0.00185X_1 - 0.66X_3$	(Wife's clothing)
(9)	$X_{11} = -1.17 + 0.000286X_1 + 1.58X_3$	(Children's clothing)
(10)	$X_{12} = 4.20 - 0.000163X_1 + 0.026X_3$	(Life insurance)
(11)	$X_{13} = 0.41 + 0.00054X_1 - 0.034X_3$	(Religion)
(12)	$X_{14} = 2.95 + 0.00101X_1 - 0.353X_3$	(Furniture)
(13)	$X_{15} = 0.13 + 0.00059X_1 - 0.0062X_3$	(Education)
(14)	$X_{16} = 0.58 + 0.00079X_1 - 0.141X_3$	(Amusement)
(15)	$X_{17} = 4.20 - 0.00076X_1 - 0.456X_3$	(Liquor and tobacco)
(16)	$X_{18} = 4.20 - 0.00033X_1 - 0.233X_3$	(Sickness)
(17)	$X_{19} = 1.01 - 0.00019X_1 + 0.857X_3$	(Equiv. ad. males in clothing ex.)
(18)	$X_{20} = 0.47 + 0.000148X_1 - 0.071X_3$	(Food ex. per man per day)

In regard to errors, the coefficients of correlation less than ± 0.2 are not significant. When the amounts of expenditure for food, rent, etc., are computed from regression equations based on correlations with the actual amounts spent, these amounts thus computed are usually within plus or minus two percent of the respective amounts computed from regression equations based on correlations with percentages of expenditure. The errors of the coefficients in the partial regression equations of Table VI are listed in Table VII. They were derived from the formula,

$$\epsilon_{y_{1.3}} = \frac{\sigma_2(1-r^2_{1.2})^{\frac{1}{2}}(1-{}_1r^2_{2.3})^{\frac{1}{2}}}{\sigma_1 n^{\frac{1}{2}}(1-r^2_{1.3})^{\frac{1}{2}}}.$$

The means and standard deviations are listed in Table VIII.

TABLE VII.

ERRORS OF THE REGRESSION COEFFICIENTS OF THE PARTIAL REGRESSION EQUATIONS.

$s_{c_{2\cdot1}}=0.0259$	$s_{c_{12\cdot1}}=0.0005$	$s_{c_{2\cdot3}}=7.96$	$s_{c_{12\cdot3}}=0.154$
$s_{c_{4\cdot1}}=0.0012$	$s_{c_{13\cdot1}}=0.0002$	$s_{c_{4\cdot3}}=0.384$	$s_{c_{13\cdot3}}=0.064$
$s_{c_{5\cdot1}}=0.0009$	$s_{c_{14\cdot1}}=0.0006$	$s_{c_{5\cdot3}}=0.278$	$s_{c_{14\cdot3}}=0.205$
$s_{c_{6\cdot1}}=0.000405$	$s_{c_{15\cdot1}}=0.00001$	$s_{c_{6\cdot3}}=0.123$	$s_{c_{15\cdot3}}=0.00398$
$s_{c_{7\cdot1}}=0.0006$	$s_{c_{16\cdot1}}=0.000019$	$s_{c_{7\cdot3}}=0.196$	$s_{c_{16\cdot3}}=0.0595$
$s_{c_{8\cdot1}}=0.00014$	$s_{c_{17\cdot1}}=0.00042$	$s_{c_{8\cdot3}}=0.433$	$s_{c_{17\cdot3}}=0.133$
$s_{c_{9\cdot1}}=0.0003$	$s_{c_{18\cdot1}}=0.0007$	$s_{c_{9\cdot3}}=0.110$	$s_{c_{18\cdot3}}=0.216$
$s_{c_{10\cdot1}}=0.00027$	$s_{c_{19\cdot1}}=0.00044$	$s_{c_{10\cdot3}}=0.0832$	$s_{c_{19\cdot3}}=0.136$
$s_{c_{11\cdot1}}=0.00038$		$s_{c_{11\cdot3}}=0.116$	

TABLE VIII.

MEANS AND STANDARD DEVIATIONS.

$M_1=1145.5$	$M_{11}=4.55$	$\sigma_1=350$	$\sigma_{11}=2.619$
$M_2=+1.5$	$M_{12}=4.11$	$\sigma_2=142.10$	$\sigma_{12}=2.515$
$M_3=3.41$	$M_{13}=0.92$	$\sigma_3=1.146$	$\sigma_{13}=1.072$
$M_4=40.14$	$M_{14}=2.91$	$\sigma_4=7.70$	$\sigma_{14}=3.377$
$M_5=19.65$	$M_{15}=0.78$	$\sigma_5=4.548$	$\sigma_{15}=0.58$
$M_6=5.69$	$M_{16}=1.00$	$\sigma_6=2.055$	$\sigma_{16}=1.017$
$M_7=10.72$	$M_{17}=1.78$	$\sigma_7=3.465$	$\sigma_{17}=2.188$
$M_8=23.92$	$M_{18}=3.03$	$\sigma_8=8.136$	$\sigma_{18}=3.525$
$M_9=3.70$	$M_{19}=3.71$	$\sigma_9=1.936$	$\sigma_{19}=2.416$
$M_{10}=2.56$	$M_{20}=0.39$	$\sigma_{10}=1.67$	$\sigma_{20}=0.124$

In Table VI, equations, numbers 2, 3, 4, 5 and 6 may be said to express the well-known Engel's laws in mathematical form, as found in the District of Columbia in 1916. Engel's first law is: As the income of a family increased a smaller percentage of it was expended for food. Our equation is quite in conformity and is: $X_4=47.00-0.01158\ X_1+1.88X_3$, where X_3 is the size of the family measured in the scale of calory requirements, and X_1 is annual income, and X_4 is the percentage of expenditure for food. His second law is: As the income of a family increased, the percentage of expenditures for clothing remained approximately the same. The equation, $X_7=5.29+0.003407\ X_1+0.449\ X_3$, shows that the percentage of expenditure for clothing rises as the income increases. The third law is: With all the incomes investigated, the percentage of expenditure for rent, fuel and light remained invariably the same. Equations number 3 and 4 in Table VI show that for this study the percentage of expenditure for rent falls slightly, as does also and at the same rate the percentage of expenditure for fuel and light. The fourth law was: As the income increased in amount a constantly increasing percentage was expended for education, health, recreation, amusements, etc.

This was also true in the present study as is shown by the equation, $X_3 = 19.00 + 0.01008\ X_1 - 1.94\ X_3$. These equations may be said to express Engel's laws quantitively.

Another possible value to these equations is that they make possible comparisons in cost of living in the cities for which they are computed. For instance, the U. S. Bureau of Labor Statistics found in a study of Portland, Me., that certain amounts were on the average spent for food, for clothing, for rent, for fuel and light, and for sundries, these amounts being for an average family of 4.2 equivalent adult males and with an average annual income of $1,335. Similar amounts of expenditure were found for Boston, but there the average family was 3.8 equivalent adult males and the average annual income was $1,520. Should it be desirable to make comparisons between the cost of living in the two places from these data, comparisons could not be made because the incomes are of different sizes and the families are also of different sizes. With such equations, however, the amounts of various expenditures for each place could be reduced to a base of the same income and the same sized family, and comparisons should be made as to the cost of living.

The equations also make it possible to tell what a family of any size and of any income (between $800 and $1,800) will spend on a variety of items of family expenditure. Thus if a family of any income and any size wanted as a guide an average budget showing distribution of expenditure, it could be easily constructed from the partial regression equations. Thus a family of husband, wife, and children of ages 4, 6 and 8 years, with an income of $1,155 a year, spent in 1916 on the average $462 for food, $227 for rent, $66 for fuel and light, $124 for clothing, and $277 for sundries (including all other expenditures). The husband spent $43 for clothes, the wife $30 and for the children there was spent $52; $47 was spent for insurance, $11 for religious purposes, $34 for furniture and furnishings, $9 for newspapers, magazines and books, $12 for such amusements as movies, theatres, pool, and dances, $20 for liquor and tobacco and $35 for sickness.

The effect of a growing family without an increase of income can be told quite specifically from these equations. Suppose a husband, wife, and three children aged 1, 3 and 5 years have

not had an increase of income in three years, still remaining at $1,000, then they will readjust their expenditures in the following manner, assuming they do not go in debt, that there has been no more children and that there has been no substantial change in the price level. They will spend $25 a year more for food, $4 less for rent and $25 less for sundries. The husband will spend $6 less for his clothing, the woman $8 less for hers and the children $19 more for theirs. The amount spent for fuel and light, insurance and religious purposes will be about the same. They will spend $4 less for furnishings, $2 less for newspapers and magazines, $2 less for movies, theatres and similar amusements, $5 less for liquor and tobacco and $3 less for sickness.

A few other conclusions of interest may be drawn from the equations in Table VI.

As the income goes down the percentage of expenditure for women's clothing diminishes most, and for children's clothing least, and as the income goes up the percentage of expenditure for women's clothing increases most and for children's least. In this regard women seem to sacrifice most and the children least.

In families of husband, wife and children of ages 4, 6 and 8 years, with an income of $1,155, the wife's clothing costs 70 per cent. as much as the husband's clothing.

For purposes of comparison with other budgetary studies, it is desirable to state the percentages of expenditure found in this study of the District of Columbia for the year 1916. For a family of husband, wife and children of ages 4, 6 and 8 years, with an income of $1,155, the following percentages of expenditure were allowed:

Food	40 per cent.
Rent	19 per cent.
Fuel and light	6 per cent.
Clothing	11 per cent.
Sundries	24 per cent.
Total	100 per cent.

An average family of man, wife and three children, of ages 4, 6 and 8 years, in the District of Columbia in 1916, was in debt, if the annual income was less than $1,155.

REMARKS ON W. F. OGBURN'S PAPER—ANALYSIS OF THE STANDARD OF LIVING IN THE DISTRICT OF COLUMBIA, 1916.*

By E. A. Goldenweiser.

Professor Ogburn's admirable paper has been peculiarly helpful to me because for many years I have read accounts of budgetary investigations and at one time I was guilty of one myself, and all through this period I have always wondered what they were for.

They do not exactly help to determine a minimum wage because the family budget often consists of more than one wage. They do not give an adequate idea of standards of living because a standard is one thing and the ability to live up to it is another ("My poverty, but not my will, consents") and, finally, budgetary studies frequently do not portray existing conditions in a representative manner for a variety of reasons. In the first place, it is difficult to select a representative group. Very frequently the fact that one can obtain budgetary studies from a group indicates that it is more methodical than the average in system but perhaps below the average in self-respect. In the second place, a member of the family, from his or her imperfect knowledge of the family expenditures, makes a more or less conscientious effort to give the canvasser the desired information. The canvasser, more or less experienced, understands the interviewed person with a considerable margin of approximation. He puts the figures down on his questionnaire, rounding them off to a certain degree. Later the schedule goes through the hands of an editor who amends it still further to make it consistent with itself and only too frequently with his own idea of what the budget ought to be. Later the tabulator goes through the schedules and takes out their substance more or less accurately. Finally, the person who writes the report rounds the figures off still further, computes averages, and draws conclusions based in part on the figures themselves but even more largely on his social philoso-

* Paper read at the Eighteenth Annual Meeting of the American Statistical Association.

phy. Then the data are published, reviewed in the Survey, and relegated to the shelves of libraries. Such has been my experience of budgetary studies for many years.

Dr. Ogburn manages the matter in a different way. His paper, as read here, deals with conclusions and social interpretations in an incidental manner. His main idea is to present to us a method of analysis, and the method, in so far as I am able to judge, is an admirable one and one that might serve to put new life into the numerous and largely futile budgetary studies which are endemic in the Unites States. By the method of correlation and of regression the author indicates ways in which budgetary studies can be made significant interpretations of social and economic conditions.

By selecting fairly uniform units, namely, families consisting of a husband and a wife with not more than three children, with an income not exceeding $1,800 a year, among whom the husband's earnings constituted not less than 75 per cent. of the total family income, he has made the statistics gathered by the Bureau of Labor Statistics sufficiently homogeneous for scientific analysis. It is interesting to note that out of 2,110 budgets collected only 200 qualified under his test. On the basis of these 200 Dr. Ogburn makes a study which shows in a mathematical and scientific way that Engel's law, formulated a half century ago, is still substantially valid at the present time in the District of Columbia, or, more properly, was valid in the District of Columbia in 1916—for no one knows what changes have occured since 1916. This well known law, states that as a family income increases a smaller proportion is expended for food, about the same percentage is expended for clothing, and the expenditures for rent, fuel and light remain unchanged, while a constantly increasing percentage is expended for education, health, recreation, amusements, etc. This law is not only in the main substantiated by the present paper but is given quantitative values. In other words, we know to what extent the expenditure for food declines, relatively, with a decreasing income and to what extent the comforts and luxuries and cultural expenditures increase. This confirmation of an old law and the infusion of quantitative values into it is a distinct contribution, as it makes it possible

for the legislator and economist to see clearly where the pressure will be felt if an element of the population is underpaid.

Dr. Ogburn shows, for instance, that a family of the type he studied cannot exist in the District of Columbia without going into debt on less than $1,155 a year. He shows that one of the first things to suffer is the clothing of the women, that the children are affected least, that the women spend only three-fourths as much for their clothes as do the men, etc. In the bulletin, which I understand is to be published by the Bureau of Labor Statistics, and in which these matters are dealt with in much greater detail, a great many other conclusions will doubtless be given and they will be of distinct value to students.

Not in a spirit of criticism, but in one of hesitancy, the question still rankles in my mind—will this refined method of mathematical interpretation be of real substantial value in overcoming the paucity and essential unreliability of the data? A man of Dr. Ogburn's scholarship is capable of selecting 200 cases out of 2,000 and of extracting from them social data of real significance. But will this sharp-edged tool of mathematical interpretation not be a dangerous one in the hands of the average investigator, and will not the semblance of scientific method add prestige to a great deal of material that on its own merits may not deserve much consideration?

Far be it from me to detract from Dr. Ogburn's service, but the suggestion occurs to me that in giving his method to the public he should introduce it with a warning—"to be used only by competent adults."

IS THE NEW IMMIGRATION MORE UNSKILLED THAN THE OLD?

By Paul H. Douglas.

It is commonly stated that the newer immigration from Southeastern Europe is more unskilled than the older immigration from Northwestern Europe.* This has been challenged by a few writers,† but it has not by any means been effectually refuted.

The purpose of this article is to consider the question of the relative skill of the new and the old immigrants when they enter this country. The varying occupations which these two classes have assumed *after* they have once entered the country will not be treated.

I.

Nature of the Problem

The statement that the new immigration is more unskilled than the old is based on the following table in Jenks and Lauck's "The Immigration Problem," page 32.

This table apparently proves that the percentage of skilled workers in the old immigration is more than twice as great as in the new; 19.5 per cent. in the former, 8.9 per cent. in the latter. The table, however, contains certain statistical fallacies. (1) Hebrews are excluded from the classification of the newer immigrants.‡ This gives a hand-picked table, as the Jews are the most highly skilled of all the newer races. To omit them from the category of the "new immigration"

* For a statement of this viewpoint see Jenks and Lauck, "The Immigration Problem," pp. 31–33.

† Notably by I. A. Hourwich, in "Immigration and Labor," see especially pp. 67–68. "The old immigrants as well as those of the present generation were mostly unskilled laborers and farm-hands." The evident intent of the author to make out a case for the newer immigrants, together with the frequent use of the *post hoc ergo propter hoc* doctrine, has led some impartial students of the question to discredit the value of his conclusions.

‡ Another table is given in the Immigration Commission Report, Vol. 1, p. 174, in which Hebrews are included. This table, however, is not copied by Jenks and Lauck. For a study of the Jewish immigration see Samuel Joseph, "Jewish Immigration to the United States," pp. 140–145, where an occupational analysis is given.

TABLE I.

OLD AND NEW EUROPEAN IMMIGRATION (INCLUDING SYRIANS) TO THE UNITED STATES (HEBREWS EXCEPTED) FOR THE PERIOD 1899–1909, INCLUSIVE, CLASSIFIED BY OCCUPATIONS.

(Compiled from United States Immigration Commission Reports.)

Occupation	Number of Persons		Per Cent.	
	Of the Old Immigration	Of the New Immigration	Old Immigration	New Immigration
Professional	56,406	17,080	2.5	0.3
Skilled laborers	442,754	441,984	19.5	8.9
Farm laborers	138,598	1,142,064	6.1	23.1
Farmers	40,633	42,605	1.8	0.9
Common laborers	402,074	1,814,180	17.7	36.7
Servants	424,698	403,784	18.7	8.2
No occupation	678,510	1,041,049	29.8	21.0
Miscellaneous	90,109	46,324	4.0	0.9
Total	2,273,782	4,949,070	100.0	100.0

would be equivalent to omitting the English or the Germans from the "old." (2) A more important defect is the years chosen as a basis for comparison. The new and the old immigration are compared for the same period of time—1899–1909. We should compare the immigration from Northwestern Europe *at a previous period*, when it was the dominant element, with the newer immigration during the years 1899–1909. Because the old immigration has numbered more skilled laborers for the past few years, it does not follow that it *did* include more skilled workers in previous years. Such a statement would be justified only if the tacit assumption that the make-up of the older immigration had not changed in the mean time were true. The Immigration Commission and Jenks and Lauck are therefore guilty of bad logic when, after comparing the two immigrations for the same period of time, they conclude "that the new immigration is much more difficult to assimilate than the old because of these characteristics of occupation."†

The truth is that the terms, "new" and "old" immigration, have been carelessly and ambiguously used. They have been used: (1) to differentiate between the peoples from Northwestern Europe, who formerly comprised the bulk of immigration, and the peoples of Southeastern Europe, who now

† Jenks and Lauck, *op. cit.* p. 33.

constitute its chief element; (2) as a time relationship—as a comparison between the immigration of one period with the immigration of an earlier one.

Confusion has resulted because the Immigration Commission failed to define these terms carefully. After comparing the two sources of immigration in accordance with the first meaning, it employed the results as applicable to the second sense as well.

In order to form a valid conclusion as to whether the immigration of the last few years is more unskilled than was the immigration of former times, it is necessary to compare the figures covering the occupational characteristics of the immigration from Southeastern Europe for the period 1899–1909, not with the immigration from Northwestern Europe for the same period, but with the figures for an earlier period before the flood of immigration from Southeastern Europe began. This gives a common basis for comparison—namely, when each constituted the chief element in immigration.

The years 1871–1882, inclusive, are typical of the conditions when the immigration from Northwestern Europe was predominant, and are comparable to the period 1899–1909 for the so-called "newer" immigration. For it was not until 1885 that the source of European immigration changed appreciably.* They also include the prosperous years of 1871–1872, the crisis of 1873, and the recovery in the late 70's and the early 80's.

The relative skill of these two immigrations can be compared on two bases. First, what percentage do the skilled workers form of the total number of immigrants in each group? Secondly, what percentage do they form of those who already have occupations (or the total number minus those without occupations). Both of these bases will be used in turn.

* The Immigration Commission uses the year 1883 as the dividing point between the supremacy of the two elements. The years 1871–1882 consequently fall within the earlier period.

II.

COMPARISON ON THE BASIS OF TOTAL IMMIGRATION.

The following table for the years 1871–1882 includes the following twelve countries: England, Scotland, Wales, Ireland, Germany, Austria, Switzerland, France, Denmark, Norway, Sweden, and Canada.* This covers all the countries of Northwestern Europe. The sources for the table are the annual reports on Immigration as found in the reports of the Bureau of Commerce and Navigation. These contain a wealth of statistical material about the previous occupation of the immigrants. Definitions of the terms "professional," "skilled," "unskilled," and "miscellaneous" are found below.†

* Canadian immigration is included because its English and French-Canadian constituents are ethnically and economically closely akin to the English and the French.

† The legitimacy of comparison may be tested by comparing the various classes as defined by the Immigration Commission and by this study. Unskilled occupations are those of servants, common laborers, farmers, and farm laborers.

1. *Servants.* This includes only one occupational group in both investigations, and is therefore easy to compare.

2. *Common laborers.* This includes only one occupational group and presents no difficulties.

3. *Farmers and farm laborers.* The Immigration Commission makes two classes of this group. The Annual Reports of the Bureau of Commerce and Navigation, 1871–1882, however, did not distinguish between them. Since the difference between the two classes is one of economic advantage, not of industrial skill, no harm is done by combining them.

4. *Professional.* The following principal occupations are included under this head:

Actors, architects, artists, authors, chemists, clergymen, dentists, druggists, editors (journalists), engineers (civil), engravers (wood-engravers), interpreters, inventors, lawyers, lecturers, lithographers, musicians, officers (civil, army, navy), physicians, reporters, scientific men, sculptors, surgeons, teachers, veterinary surgeons, actuaries, auctioneers, bankers, brokers, managers (superintendents), nurses, showmen, sisters of charity (nuns), students.

5. *Skilled laborers.* The Immigration Commission defines skilled laborers as "persons whose work is less physical but still manual and who may be highly skilled as carpenters, stone-masons, tile-setters, painters, blacksmiths, mechanics, tailors, and the like." (Abstracts of Reports U. S. Immigration Commission, Vol. II., p. 758.)

The following are the principal trades included in "skilled labor" in this study:

Burnishers, butchers, button-makers, cabinet-makers, calendrers, calico-printers, calkers, cap-makers, carders, card-makers, carpenters and joiners, carriage-trimmers, carvers and gilders, casters, cement-makers, clerks, clothiers, coach-builders, color-grinders, comb-makers, confectioners, coopers, coppersmiths, cork-cutters, cotton manufacturers, cutlers, decorators, designers, die-sinkers, distillers, draughtsmen, dressmakers, dyers, embroiderers, engine-makers, engineers, fancy goods makers, foremen, fishhook-makers, flax-dressers, flour-makers, frame-makers, fringe-makers, furnace-men, furriers, gardeners, gas fitters, gas manufacturers, glass-workers, glaziers, glove-makers, gunsmiths, hackle-makers, ham-curers, hatters, hosiers, instrument-makers, iron-dressers, iron-founders, iron manufacturers, iron-moulders, iron-puddlers, iron-turners, iron-workers, ivory-workers, jewelers, lace manufacturers, lamp-makers, lapidaries, linen manufacturers, lock smiths, loom-repairers, millwrights, miners, musical instrument makers, nail-makers, operatives (cotton), opticians, packers, painters, paperhangers, paper-makers, paper-stainers, pattern-makers, pearl-divers,

The method of classification employed, it is believed, makes the results comparable with those for the later period as classified by the Immigration Commission.

TABLE II.

TOTAL IMMIGRATION FROM NORTHWESTERN EUROPE (INCLUDING CANADIANS) FOR THE PERIOD 1871–1882, INCLUSIVE, CLASSIFIED BY OCCUPATIONS.

Occupation	Number	Per Cent.
Professional	30,515	0.8
Skilled laborers	420,822	11.4
Farmers and farm laborers	372,986	10.1
Common laborers	714,924	19.3
Servants	143,587	3.9
Miscellaneous	93,938	2.5
Not stated	58,832	1.6
Total with occupations	1,835,508	49.6
Total without occupations	1,865,205	50.4
Total immigration	3,700,713	100.0

Compare this with the following table covering the immigrants from Southeastern Europe who entered the United States during the years 1899–1909, inclusive.

pipe-makers, plasterers, plate-layers, platers, polishers, plumbers, potters, printers, refiners, riggers, rope-makers, saddlers, harness-makers, safe-makers, sail-makers, sawyers, sealing-wax makers, seamstresses, shipwrights, shoemakers, slaters and tilers, smelters, spinners, stay and corset makers, steel manufacturers, stonecutters, tailors, tallow-chandlers, tanners and curriers, telegraphers, tenters, thatchers, tile-makers, tinkers, tin-dressers, tinners, tin-platers, tobacco manufacturers and dealers, tool-grinders, tool-makers, toy-makers, truss-makers, twisters, umbrella-makers, undertakers, upholsterers, varnish-makers, vine-growers, vulcan-workers, watch and clock makers, weavers, wheel-wrights, whitesmiths, wire manufacturers, wire-workers, wool-dressers, woolen manufacturers, wool-sorters, accountants (bookkeepers, cashiers), bakers, barbers, basket-makers, belt-makers, blacksmiths, bleachers, block-cutters, block-makers, block-printers, boat-builders, boiler-makers, book-binders, bootfitters, bottlers, brass-workers, brewers, brick-makers, broom and brush-makers, builders, coachmen, cooks, foresters, railroad men.

6. *Other occupations.* This is parallel with the "Miscellaneous" class of the Immigration Commission. It includes the following occupations: Agents (factors), bar-keepers, bird-dealers, boat and barge men, book-sellers (stationers), capitalists (proprietors), card-master n. o. d., cattle-dealers, cellar-men, chimney-sweepers, contractors, curriers, dairymen, fishermen, fruit-dealers, grocers, heaters n. o. d., horse-dealers, hotel-keepers, hunters, iron-dealers, jockeys, launderers, laundresses, lumbermen, masters n. o. d., merchants n. o. d., midwives, outfitters, peddlers, publishers, quarrymen, salesmen, scourers, shepherds, soldiers, speculators, teamsters, trainers n. o. d., travelers (commercial), travelers n. o. d., watchmen, wood-cutters.

TABLE III.

TOTAL IMMIGRATION FROM SOUTHEASTERN EUROPE (INCLUDING SYRIANS) FOR THE PERIOD 1899–1909, INCLUSIVE, CLASSIFIED BY OCCUPATIONS.

(From Report of United States Immigration Commission, 1911, Volume 1, page 174.)

Occupation	Number	Per Cent.
Professional	23,916	0.4
Skilled laborers	804,920	16.6
Farm laborers	1,151,697	19.4
Farmers	43,513	0.7
Common laborers	1,880,491	31.7
Servants	465,395	7.8
Miscellaneous	82,543	1.4
No occupation	1,486,777	25.0
Total	5,939,252	100.0

Thus while only 11.4 per cent. of the earlier immigrants from Northwestern Europe were skilled, the later immigration from the Slavic and Mediterranean countries had 16.6 per cent. of its number skilled workmen. If we choose the total immigration as the base upon which the occupational distribution must be computed, we are then forced to conclude that the "new immigration," instead of being less skilled, is really more skilled than the "old immigration." Incidentally it may be said that Jenks and Lauck used this base; so judging by their standards, their conclusions must be held to be erroneous.

III.

COMPARISON ON THE BASIS OF IMMIGRANTS WITH OCCUPATIONS.

There is a very strong objection to a comparison based on the total immigration. Though the older immigration has apparently fewer skilled craftsmen relatively than the newer, 50.4 per cent. of the older immigrants were without occupation (principally women and children) while only 25 per cent. of the new element is composed of this class. The older immigration suffers, consequently, in a comparison because of the presence of these women and children.

Are the conclusions altered by eliminating those immigrants who have no occupations? First, let us examine the statistics for the "old" immigration.

The following table gives the occupational distribution of the immigrants from the countries of Northwestern Europe during the years 1871–1882.

TABLE IV.

IMMIGRANTS WITH OCCUPATIONS FROM NORTHWESTERN EUROPE (INCLUDING CANADIANS) FOR THE PERIOD 1871–1882, INCLUSIVE, CLASSIFIED BY COUNTRY AND OCCUPATIONS.

Country	Professional		Skilled Laborers		Farmers and Farm Laborers		Common Laborers		Servants		Miscellaneous Occupations		Occupations Not Stated		Total with Occupations	
	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.
1. Great Britain ..	8,305	2.4	118,333	34.3	31,083	9.0	134,372	39.0	24,271	7.0	24,353	7.1	4,186	1.2	344,903	100.0
2. Ireland.....	2,416	0.8	32,062	10.0	16,642	5.2	193,325	60.5	66,667	20.7	5,322	1.6	3,145	1.0	319,579	100.0
3. Germany*.....	9,743	2.0	132,057	26.5	128,553	25.7	167,295	33.5	14,087	2.8	31,245	7.3	11,186	2.2	499,166	100.0
4. Austria†.....	688	1.5	6,104	18.6	7,190	16.5	22,614	51.8	836	1.9	3,566	8.0	743	1.7	43,681	100.0
5. Scandinavian Countries‡ ...	1,480	0.7	35,027	15.6	51,152	22.7	116,518	51.8	15,382	6.8	2,670	1.2	2,603	1.2	224,832	100.0
6. France.....	3,978	7.5	18,297	34.4	5,887	11.1	12,937	24.3	2,718	5.1	7,896	14.7	1,438	2.9	53,151	100.0
7. Switzerland....	745	2.8	9,206	34.7	9,005	34.0	4,007	15.1	989	3.7	2,364	8.9	205	0.8	26,521	100.0
8. Canada§	3,164	0.9	67,636	20.9	123,474	38.1	63,856	19.7	18,637	5.8	11,582	3.6	35,326	10.9	323,675	100.0
Total.....	30,515	1.7	420,822	22.9	372,986	20.4	714,924	38.9	143,587	7.8	93,938	5.1	58,832	3.2	1,835,508	100.0

* These figures include Austrian immigration for the years 1871 and 1872.
† These figures are only for the period 1873–1882, inclusive.
‡ This group includes Norway, Sweden, and Denmark.
§ Canada includes Quebec, Ontario, Nova Scotia, New Brunswick, Prince Edward's Island, Newfoundland, Labrador and Vancouver's Island.

Under this new basis the skilled workers comprise 22.9 per cent. of the total instead of 11.4 per cent., as before. The relative distribution of occupations in the different national groups is especially noteworthy; 36.7 per cent. of the English, 41.9 per cent. of the French, 37.5 per cent. of the Swiss, and 28.5 per cent. of the Germans were either professional or skilled workers, while only 10.8 per cent. of the Irish, 16.3 per cent. of the Scandinavians, and 21.8 per cent. of the Canadians belonged to these classes. On the other hand 81.2 per cent. of the Irish were either laborers or servants, as were 58.6 per cent. of the Scandinavians, while only 46 per cent. of the English belonged to these classes, 36.3 per cent. of the Germans, 29.4 per cent. of the French, and 18.8 per cent. of the Swiss.

The next table gives similar figures for the immigration from Southeastern Europe for the later period.

TABLE V.

IMMIGRANTS WITH OCCUPATIONS FROM SOUTHEASTERN EUROPE (INCLUDING SYRIANS) FOR THE PERIOD 1899–1909, INCLUSIVE, CLASSIFIED BY OCCUPATIONS.

(Compiled from Report of the United States Immigration Commission, 1911, Volume I, page 174.)

Occupation	Number	Per Cent.
Professional	23,916	0.5
Skilled laborers	804,920	18.1
Farm laborers	1,151,697	25.8
Farmers	45,513	1.0
Common laborers	1,880,491	42.2
Servants	465,395	10.5
Miscellaneous	82,543	1.9
Total with occupations	4,452,475	100.0

A comparison of Tables IV and V shows that 1.7 per cent. of the total number of immigrants with occupation from countries representative of the old immigration were professional, whereas only 0.5 per cent. of the new immigrants were of this class. Skilled workers comprised 22.9 per cent. of the immigrants from the countries from Northwestern Europe; 18.1 per cent. of those from Southeastern. Here the difference, though real, is not decisive. Two-ninths of the earlier immigrants with occupations from the countries which we believe to be ethnically and industrially similar to ours were skilled; two-elevenths of those that we regard as absolutely alien to us are skilled.

IV.

CONCLUSION.

The figures given by Jenks and Lauck showing that the "new immigration" is less than half as skilled as the "old" are fallacious, owing to the fact that they cover the same years. The statistics given in this article comparing the years 1871–1882 with 1899–1909 afford a truer criterion for comparison. Comparing the total immigration from Northwestern Europe during the earlier period with that from Southeastern Europe during the later, we find that the older immigration had only 11.4 per cent. of its numbers skilled workers, while the newer immigration has 16.6 per cent. On this basis of comparison, therefore, the newer immigration has proportionately 50 per cent. more skilled workers than had the earlier.

If we compare these two migrations solely in relation to the number of immigrants with occupations, the conclusions are somewhat changed; 18.1 per cent. of the recent immigrants from Southeastern Europe are skilled, whereas 22.9 per cent. of the older set were skilled. Using this base, the workers of the new immigration are relatively eight-tenths as skilled as those of the old, instead of less than one-half, as the figures of Jenks and Lauck would lead us to suppose. It must furthermore be emphasized that Jenks and Lauck compared the total immigration, irrespective of whether the immigrants had occupations or not; the employment of this method led to the results given in the previous paragraph, namely that the new immigration is 50 per cent. more skilled than the old.

It is an open question whether the total immigration or the total with occupations should be the proper basis for comparison. Certainly the first does not give a true picture, since it includes children; the second is deficient, however, in that it does not include many women who later enter American industrial life as unskilled workers. Neither one can be selected as the sole basis for judgment. Considering that since the first base shows the newer immigration to include relatively more skilled workers than the old immigration, while the latter reverses the situation to a less degree, is it not fair to

conclude, in view of the inadequacy of either of these bases as a sole criterion, that skilled craftsmen are now relatively not less important than in the earlier immigration? Is it not accurate to state that the new immigration is approximately as skilled as the old?

We should remember, however, that statistics measure quantitative differences only; they are not a true index of qualitative differences. Though the statistics here produced show that Southeastern Europeans have as many skilled workers relatively as Northwestern Europeans, it does not follow that within this class the workers are as highly developed in their line of work as the men from the corresponding skilled class in Northwestern Europe.

If this long-accepted belief in the higher percentage of skilled workers among the old immigration is, after all, erroneous, why has it been cherished for so long? In the first place because we have not realized that the character of the immigration from Northwestern Europe has changed in the last thirty years. Whereas from 1871 to 1882 only 11.4 per cent. of the total number from this section of Europe were skilled, during the period 1899–1909, 19.5 per cent. of these immigrants were skilled. During the period 1871–1882 the skilled workers comprised 22.9 per cent. of the total with occupations; by 1899–1909 this had risen to 27.8 per cent. Thus the immigration from Northwestern Europe is today more skilled than it was formerly. The unskilled laborers from the Southeast have displaced the unskilled laborers from the Northwest, and have left the latter countries with a more highly skilled emigrant constituency. The Immigration Commission and Jenks and Lauck came to their conclusion because they neglected this change in the immigration from Northwestern Europe.

Secondly, in speaking of the old immigration we commonly think of the English, the Welsh, the Scotch, the French, and the Germans, all highly skilled populations; we forget the Irish, the Danish, the Norwegians, and the Swedish, essentially agrarian and not industrial peoples. As was shown, only 10 per cent. of the Irish immigrants with occupations during this early period were skilled, and only 15.6 per cent.

of the Scandinavians. This is greatly below the percentage of skilled craftsmen in the new immigration.

Finally, it is the custom of each generation to view the immigrants of its day as inferior to the stock that once came over. Some of this prejudice against the newer races has not been wholly absent from some of the writings upon American immigration problems.

NOTICE.

Report on the seventy-fifth anniversary funds of the American Statistical Association, including income and expenditure for the Memorial Volume, "History of Statistics," 1913 to December, 1918, as required by resolutions of the Association passed at the Annual Meeting, 1918:

INCOME.

Contributions by members to the 75th Anniversary Fund with interest on same, 1913–1916	$1,097.16	
Sales of 175 Volumes to Members, 1918	672.31	
Receipts from sales by Macmillan, 1918	244.16	
Loan to meet deficit	1,500.00	
Total		$3,513.63

EXPENDITURES.

Anniversary Dinner, Boston, 1914	$287.40	
Preparation of Volume, 1914–1918 (exclusive of press work)	702.60	
Printing of Volume, 1918, (Rumford Press)	2,200.00	
Total		3,190.00

Balance owed Rumford Press Dec., 1918 527.75
(This balance has been paid since Dec., 1918.)

To meet the deficit indicated above the Association authorized the Board to borrow $1,500.00, giving as security Boston and Albany R. R. stock, 17 shares, owned by the Association. This was done by the Treasurer and the loan is still outstanding

ROB'T E. CHADDOCK,
Secy.-Treas.

REVIEWS AND NOTES.

Cost Accounting, by J. Lee Nicholson, C. P. A., and John F. D. Rohrbach, C. P. A. New York: The Ronald Press, 1919. 576 pp.

The readers of the QUARTERLY who are engaged in the increasingly important task of applying the statistical method to the internal records of large corporations will find this book on cost accounting of great assistance. The work of statisticians connected with manufacturing or selling organizations involves not only the handling of summary figures that are furnished them ready-made but also the critical examination of the methods of collecting and assembling these figures. Those, therefore, who are interested in the technique of business measurement will want to use this volume.

Although the reader will not come upon references to theoretical statistics, he will, as he turns the pages, find many places in which cost accounting enables him to apply to business the familiar devices of the trained statistician, such as frequency studies, correlation, means, medians and modes. The chapter on estimated costs suggests the opportunity for applying the method of sampling, and computing percentages of error. It is interesting also to note that in two places the authors make favorable reference to the use of graphic representation of cost data for the purpose of executive control.

The book is an extention of Nicholson's "Cost Accounting, Theory and Practice," published in 1913. As stated in the preface, one of the important aims of the book is to "classify the details of cost accounting so that the reader, be he accountant, manufacturer, or student, is given a well-defined idea of the forms and records required for each separate operation." The book is complete and comprehensive without undue length. The writer of this review has discussed the merits of the book with expert accountants both in the East and the Middle West and found the opinion unanimous that it covers the ground clearly and fully. The present edition contains additional valuable matter concerning depreciation rates. The subject of depreciation is well treated. In view of the wide-spread interest in cost-plus contracts, and the making and suspending or cancelling of contracts with the government, the discussion of these subjects is very important just at this time.

One of the authors was chairman of the Interdepartmental Conference on Uniform Contracts, and Cost Accounting Definitions. This conference consisted of delegates from the Departments of War, Navy, Commerce and other government bodies. The purpose of the conference was expressed by its name.

Uniform cost methods—or as the authors prefer to say—uniform methods of cost finding come in for considerable emphasis. To quote directly:

"Their main object and chief advantage of their use is that all costs may be figured in precisely the same way. Any mistakes made in determining the selling price would then be the same throughout that particular trade, in which event, unfair and ignorant competition would cease, despite the faults or deficiencies in the methods of cost finding adopted."

The manner in which the authors have handled their subject commands attention. They are careful not only to define their own terms but to present the definitions of similar terms used by others. This will be appreciated by those who have had to follow cost analyses. In matters on which there is a variety of opinion they have explained all contentions, for example, whether or not interest on capital invested should be regarded as an element of cost. At the same time they have not been afraid to state their own opinion and the reasons for it. Where it is possible to follow several different methods, the advantage of one method over another under certain circumstances is clearly stated, as for example the various methods of prorating factory overhead charges.

The entire work is a happy combination of theory and practical example. The writer found that the book is being used as a handbook in a number of organizations where cost systems were being installed or improved. The forms are illustrated and can be followed in actual practice. The chapter on the examination of the plant preparatory to the installation of a cost system contains a very valuable checking list which should furnish statisticians with a wealth of suggestions for the analysis of business.

Good English, clear type, and splendid arrangement of text make the book pleasing and attractive. An analytical table of contents covering fourteen pages, and a detailed index furnish means of quick reference. Concise and comprehensive summaries at the end of nearly every chapter enable the reader to review the subject matter and to fix in mind the points emphasized.

ARTHUR R. BURNET.

Housing Standards in Brooklyn. By John C. Gebhart. Published by the Tenement House Committee of the Brooklyn Bureau of Charities, October, 1918. Pp. 60.

This report, dealing with the housing of 3,227 Brooklyn families, is based on information obtained through the Relief Department and the District Nursing Committee of the Brooklyn Bureau of Charities, the Jewish Aid Society, and the Tuberculosis Day Camp. The study, therefore, has to do with families which are either dependent or under the care of a philanthropic agency by reason of illness. Statistics are presented and discussed under the following main heads: Sanitation, interior rooms, room overcrowding, lodgers, land overcrowding, type of dwelling, tuberculosis, rents, and nationalities.

In purpose and scope the report is a description of the conditions affecting a given group of families, rather than an attempt to trace causes and effects

(p. 58). An exception is the finding, tentatively stated, that the presence of tuberculosis is more closely related to room overcrowding than to faulty sanitation.

While the analysis is, in general, cautious and sound, the statistical reasoning is open to question at certain points. Thus, the author appears to assume that the number of families per dwelling, without reference to the size of the dwelling, is a trustworthy index of land overcrowding. Again, as the report emphasizes the effect of economic status upon housing, the comparison of room crowding in this group of mainly dependent families with Rowntree's data for the entire working population of the city of York, England, appears lacking in point. The reviewer is not convinced by reasoning to the effect that, because 50 per cent of the families paid rentals of from $10 to $15 per month, and "since the item of rent has been found to consume from 25 to 30 per cent of the family income of the working population," therefore "it is fair to assume that the average family studied has an income of about $50 a month or $600 a year" (pp. 40 and 54).

A feature of the report which will be regretted by statisticians is the absence of an adequate statement as to the manner and method of the inquiry. When was the study made? Was a schedule used and, if so, what did it include? What is the relation, numerical and otherwise, of the group of families studied to the whole number of dependent families in Brooklyn? The report does not answer these questions.

In view of change in prices, wages, and opportunities for employment that has occurred within the past few years it seems important to know whether or not the data for all the families relate to the same period of time. The statement (p. 47) that reports as to nationality in some instances were "based on personal impression rather than scientific inquiry," raises a question as to the methods by which the facts were collected.

In discussing the sufficiency of the number of cases studied, the author compares the families for which information was secured with the total population of Brooklyn. The purpose of this comparison is not clear. The author is dealing with families coming under the care of philanthropic agencies; hence the number of families considered should be related to the entire number of families which have found it necessary to apply to such agencies for assistance.

The preceding paragraphs have been written from the standpoint of the statistician concerned with methods of social research. In judging the results of the study it should be said that the statistics are, in general, stated and analyzed in a way that implies a painstaking and thorough inquiry. The author's findings regarding the housing of the dependent poor in Brooklyn will be of value to social workers seeking to improve these conditions and will provide investigators in other cities with material for significant comparisons.

EARLE CLARK.

ANNUAL CENSUS OF THE INSANE AND FEEBLE-MINDED, EPILEPTICS AND INEBRIATES IN INSTITUTIONS IN THE UNITED STATES JANUARY 1, 1918.

(Published in *Mental Hygiene* for January, 1919.)

This is the second annual census of the defective classes published under the auspices of the National Committee for Mental Hygiene and prepared by Horatio M. Pollock, statistician of the New York State Hospital Commission and Edith M. Furbush, statistician of the National Committee for Mental Hygiene.

The study is based on reports from 575 institutions, of which 346 were public and 229 private. No attempt was made to secure data from almshouses, penal or reformatory institutions.

On January 1, 1918, there were 239,820 insane patients under treatment in institutions in the United States. Compared with the census of 1917, taken under the same auspices, the number shows a total increase of 6,947 patients. The sex distribution of the insane under treatment varies widely in the several states; but the relative proportion of the sexes has shifted but little. The ratio shown by the present census is 110.55 males to 100 females. The women outnumber the men in some of the eastern and southern states, while the men are greatly in excess in most of the western states.

There is a steady upward trend in the ratio of insane in institutions to the general population. In most of the states where the increase of the insane in institutions has been most marked it is unquestionably due to enlarged provisions for their care. In short, the high rates of insanity in the different states do not necessarily indicate a greater prevalence of mental disease but rather that a larger proportion of the total number of insane in the community is being cared for.

The census shows a total of 39,381 feeble-minded persons in institutions, an increase of 2,567 as compared with 1917. Institutional care of the feeble-minded is not well developed in several states. In Alabama and Georgia there are no state institutions for the feeble-minded. In Arizona, Arkansas, Delaware, Florida, Idaho, Louisiana, Mississippi, Mew Nexico, Nevada, South Carolina, Tennessee, Utah and West Virginia, the feeble-minded are cared for in state hospitals for the insane. "In no state does the provision for the feeble-minded equal that made for the insane." Indeed, it is borne out by the statistics that private institutional care of the feeble-minded is relatively farther advanced than public institutional care.

It is a hopeful sign that many state institutions for feeble-minded have recently been established. During 1917 and 1918, five states authorized the establishment of institutions for feeble-minded and in seven others additional institutional facilities were provided for this class.

Epileptics to the number of 11,944 were found in institutions on January 1, 1918. As is well known, only a small proportion of the total number of epileptics is cared for in institutions of any kind.

There were 3,565 inebriates under institutional care, and by far the

largest proportion in public institutions. For the census year, the inebriates in institutions showed a total decrease of 1,326, or 37.2 percent. "The figures give conclusive proof that inebriety is a decreasing rather than a growing evil in this country." In speaking of the wide variations in the number of inebriates cared for in the several states, the authors say that it "is partly due to the lack of institutions for inebriates in some states and partly due to the lack of inebriates in others."

The National Committee for Mental Hygiene performs a genuine service in taking an annual census—even if it be quite summary—of the various defective classes in public and private institutions. The work has been done most carefully and supplements in a desirable manner the too infrequent reports of the Federal Census.